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Revision 2

REMEDIAL ACTION WORK PLAN FOR OU 10–03 ORDNANCE REMOVAL ACTION

Prepared By

WYLE LABORATORIES
Scientific Services & Systems Group
Norco, California

July 22, 1994

WYLE LABORATORIES

Prepared under MK--FIC Contract No. S–500992, Ordnance Removal Action at the Idaho National Engineering Laboratory.

WYLE LABORATORIES	Document No. 23-ICP-02-1 Revision No. 2

DOCUMENT TITLE: RA Work Plan for OU 10-03 Ordnance Removal Action

This document has been reviewed in its entirety and is approved for release by the following personnel:

Quality Assurance Manager
Wyle Laboratories

7-19-94
Date

Project Manager
Wyle Laboratories

7/15/94
Date

Project Superintendent
Wyle Laboratories

7/19/94
Date

Revision	Date	Revision Description
0	5-2-94	Original Issue
1	5-24-94	Incorporate DOE and MK-FIC comments
2	7-14-94	Incorporate MK-FIC comments

FOREWORD

This document entitled, "Remedial Action Work Plan for OU 10–03 Ordnance Removal Action," has been prepared by Wyle Laboratories under the MK–Ferguson of Idaho Company Contract No. S–500992.

The information presented in this document describes Wyle Laboratories' strategy for accomplishing the work associated with OU 10–03 Ordnance Removal Action.

The information contained herein has been extracted from the approved OU 10–05 document entitled, "Interim Ordnance Cleanup Program – Remedial Action Work Plan." Changes which may be noted in comparing this document and the approved OU 10-05 document are directly associated with the three new work areas and downsizing of the scope of work.

This document is submitted herewith for review and comment.

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ACRONYMS

%RSD	Relative Standard Deviation
ACGIH	American Conference for Government Industrial Hygienists
ADQ	Audits of the Data Quality
AE	Architectural Engineering
AEC	Atomic Energy Commission
ALARA	As Low As Reasonably Achievable
ANSI	American National Standards Institute
ARAR	Applicable or Relevant and Appropriate Requirements
ASM/AL	Area Shift Manager/Area Landlord
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
ATL	Audit Team Leader
BDAT	Best Demonstrated Available Technology
BEI	Biological Exposure Indices
BLM	Bureau of Land Management
BNA	Base/Neutral Analysis
CAR	Corrective Action Report
CDL	Commercial Driver's License
CEHND-ED-SY	Corps of Engineers, Huntsville Division—Explosives Division Safety
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFA	Central Facilities Area
CFR	Code of Federal Regulations
CID	Construction Interface Document
CLP	Contract Laboratory Program
CoC	Chain-of-Custody
COCA	Compliance Order and Consent Agreement
CoE	Corp of Engineers
CONWEP	Army Technical Manual (TM) 5-855-1, Fundamentals of Protective Design for Conventional Weapons
COTR	Contracting Officer Technical Representative
CPR	Cardio Pulmonary Resuscitation
CR	Code of Regulations
CRREL	Cold Regions Research and Engineering Laboratory
CRZ	Contamination Reduction Zone
CSM	Chemical Surety Material
CSWP	Construction Safe Work Permit
DART	DartAmerica
dBA	Decibels Absolute
DCO	Document Control Officer
DMS	Data Management System
DNB	Dinitrobenzene
DNT	Dinitrotoluene
DOD	Department of Defense
DOE	Department of Energy
DOE–ID	Department of Energy Idaho Field Office
DOT	Department of Transportation
DRR	Document Revision Request
EBR	Experimental Breeder Reactor
ECC	Emergency Control Center
EE/CA	Engineering Evaluation/Cost Analysis
EEDs	Electro Explosive Devices
EG&G	Edgerton Germishausen and Grier
EM	Engineer Manual
EMM	Earth Moving Machinery

EMR	Electromagnetic Radiation
EOD	Explosive Ordnance Disposal
EODP	Explosive Ordnance Disposal Publication
EPA	Environmental Protection Agency
ERP	Environmental Restoration Program
ES&H	Environmental Safety and Health
EZ	Exclusion Zone
FFA/CO	Federal Facility Agreement and Consent Order
FCC	Federal Communication Commission
FID	Flame Ionization Detector
FM	Field Manual; Factory Mutual
FM	Frequency Modulation
FR	Federal Register
g	grams
GFCI	Ground Fault Circuit Interruptor
GPR	Ground Penetrating Radar
HAZCOM	Hazards Communication
HAZMAT	Hazardous Material
HEAT	High Explosive Anti-tank
HERO	Hazards of Electromagnetic Radiation to Ordnance
HF	High Frequency
HMX	Cyclotetramethylenetetranitramine
HPLC	High Performance Liquid Chromatography
HSO	Health and Safety Officer
HVAC	Heating Ventilation and Air Conditioning
HWE	Hazardous Waste Engineer
IA	Interim Action
IAW	In Accordance With
ICPP	Idaho Chemical Processing Plant
ID	Identification
IDAPA	Idaho Administrative Procedures Act
IDEQ	Idaho Department of Environmental Quality
IDHW	Idaho Department of Health and Welfare
IDLH	Immediately Dangerous to Life and Health
IH	Industrial Hygienist
INEL	Idaho National Engineering Laboratory
IOCP	Interim Ordnance Cleanup Program
JSS	Job Site Supervisor
L&Q	Limitations and Qualifications
LDR	Land Disposal Restriction
LEL	Lower Explosive Limit
MDL	Method Detection Limit
MK-FIC	Morrison Knudson-Ferguson of Idaho Company
ml	milliliter
mph	Miles Per Hour
MS/MSD	Matrix Spike/Matrix Spike Duplicate
MSDS	Material Safety Data Sheet
NA	Number Not Recognized For International Transportation
NAAQS	National Ambient Air Quality Standards
NAVSEA OP	Naval Sea Systems Command
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NCR	Non-conforming Report
NEC	National Electrical Code
NESC	National Electrical Safety Code
NEW	Net Explosive Weight
NFPA	National Fire Protection Association
NIOSH	National Institute of Occupational Safety and Health

NIST	National Institute of Standards and Technology
NOAA	National Oceanic and Atmospheric Administration
NODs	Notices of Deviation
NODA	Naval Ordnance Disposal Area
NOP	Naval Ordnance Plant
NPL	National Priority List
NPG – Arco	Naval Proving Ground
NRF	Naval Reactor Facility
O&M	Operations and Maintenance
OC	Operating Characteristic
OEL	Occupational Exposure Limit
OEW	Ordnance Explosive Waste
OMP	Occupational Medical Program
OSHA	Occupational Safety and Health Act
OU	Operable Unit
OVA	Organic Vapor Analyzer
PC	Personal Computer
PCB	Polychlorinated Biphenyl
PEL	Permissible Exposure Limit
PETN	Pentaerythrite Tetranitrate
PFIR	Prefinal Inspection Report
PID	Photoionization Detector
PjM	Project Manager
PPE	Personal Protective Equipment
PPM	Parts Per Million
PPRD	Preliminary Prefinal Remedial Design
PSD	Prevention of Significant Deterioration
PTI	Protection Technology Idaho, Inc.
PZ	Piezoelectric
QA	Quality Assurance
QAMS	Quality Assurance Management System
QAO	Quality Assurance Officer
QAP	Quality Assurance Program
QAPjP	Quality Assurance Project Plan
QAPP	Quality Assurance Program Plan
QC	Quality Control
QE	Quality Engineer
RA	Remedial Design
RAA	Remedial Action Area
RAC	Risk Assessment Code
RAE	Remedial Action Engineer
RAR	Remedial Action Report
RAS	Routine Analysis Services
RAWP	Remedial Action Work Plan
RCRA	Resource Conservation and Recovery Act
RCT	Radiological Control Technician
RDX	Hexahydro-1,3,5-trinitro-1,3,5-triazine
RF	Radio Frequency
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
ROPS	Rollover Protective Structures
RPD	Relative Percent Difference
RPM	Regional Project Manager
RQ	Reportable Quantities
RSD	Relative Standard Deviation
RSR	Records Search Report
RWMC	Radioactive Waste Management Complex

S&H	Safety and Health
SAL	Specified Assurance Level
SAP	Sampling and Analysis Plan
SAP/QAPjP	Sampling and Analysis Plan/Quality Assurance Project Plan
SAR	Safety Analysis Report
SARA	Superfund Amendments and Reauthorization Act
SARM	Standard Analytical Reference Materials
SAS	Special Analysis Services
SCBA	Self Contained Breathing Apparatus
SDWA	Safe Drinking Water Act
SE	Safety Engineer
SMO	Sample Management Office
SOG	Standard Operating Guidelines
SOP	Standard Operating Procedure
SRM	Special Resource Management
SSES&H	Site Specific Environmental Safety and Health
SSO	Site Safety Officer
SWP	Safe Work Permit
SZ	Support Zone
TAN	Test Area North
TAP	Toxic Air Pollutants
TBBR	Twin Buttes Bombing Range
TCLP	Toxicity Characteristics Leachate Procedure
TDU	Temporary Decontamination Unit
TEL	Threshold Exposure Limit
TEU	Technical Escort Unit
TLV	Threshold Limit Value
TM	Technical Manual
TNB	Trinitrobenzene
TNT	2,4,6-trinitrotoluene
TO	Technical Order
TRA	Test Reactor Area
TSCA	Toxic Substances Control Act
TSD	Temporary Storage and Disposal
UL	Underwriters Laboratories
UN	Identification Number for International Transportation
USATHAMA	United States Army Toxic Hazardous and Munitions Agency
USCG	United States Coast Guard
USGS	United States Geological Service
UXO	Unexploded Ordnance
V/V	Verification and Validation
VOA	Volatile Organic Analysis
VOC	Volatile Organic Compound
VT	Variable Time
WAC	Waste Acceptance Criteria
WAG	Waste Area Group
WCC	Warning Communications Center
WOG	Wyle Operating Guidelines
WP	White Phosphorous
WWIII	Waste Wrangler III

Section 1
INTRODUCTION

1.1 OVERVIEW

This document, the Remedial Action Work Plan (RAWP), defines the plan of action for implementing the Interim Ordnance Cleanup Program Remedial Design for OU 10–05, further defined in the EE/CA for OU 10–03, Ordnance Removal Action at Unexploded Ordnance (UXO) Locations at the Idaho National Engineering Laboratory (INEL). The work will be performed by Wyle Laboratories for the MK-Ferguson of Idaho Company (MK-FIC) under contract to the Department of Energy (DOE).

The specific mission of this action is to locate, identify, detonate, and dispose of unexploded ordnance and associated shrapnel at three sites, subsequently referred to as "work areas," on the INEL property.

The three work areas, as identified in the Engineering Evaluation/Cost Analysis (EE/CA) for this interim action, are located in the southern portion of the INEL property as shown in Figure 1-1. The areas are specifically identified as follows:

- 40 acres within the Naval Ordnance Disposal Area (NODA)
- 90 acres within the Twin Buttes Bombing Range (TBBR)
- Four 16–inch shells located east of Lincoln Blvd. at Milepost 17

The three areas and the work to be performed in each are briefly described in the paragraphs that follow. The locations of these areas are further defined in Figures 1–2, 1–3, and 1–4.

Naval Ordnance Disposal Area (NODA). The NODA site is located approximately one mile northeast of the Protection Technology Idaho (PTI) Gun Range. The work involves the search for and removal of unexploded ordnance and other ordnance devices as yet undefined from a 40-acre area.

Twin Buttes Bombing Range (TBBR). This area is located south of Argonne National Laboratory – West. The work involves searching for and removing UXO from a 90–acre site.

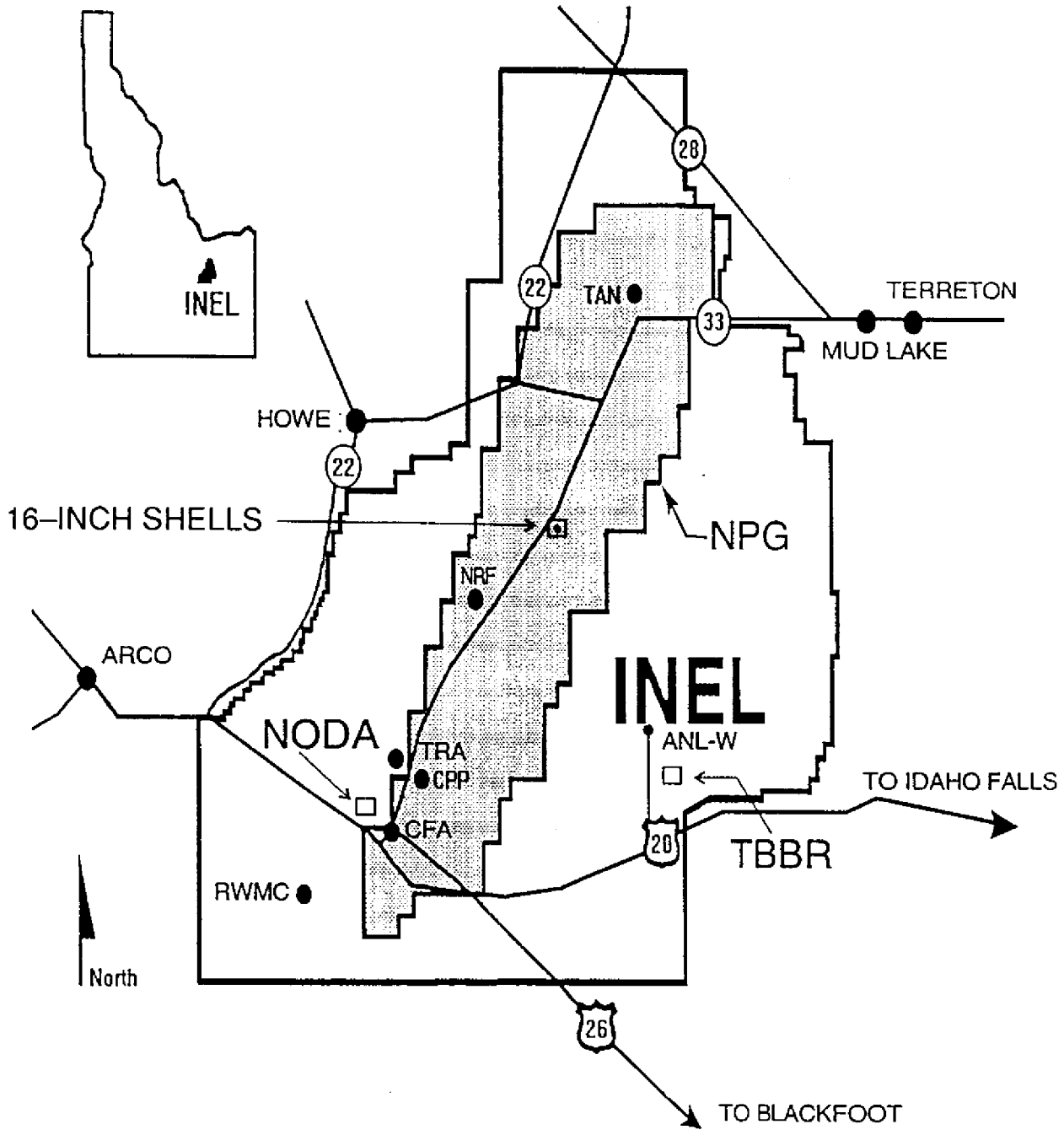


Figure 1-1. Map of the INEL Showing the Location of the Ordnance Removal Action

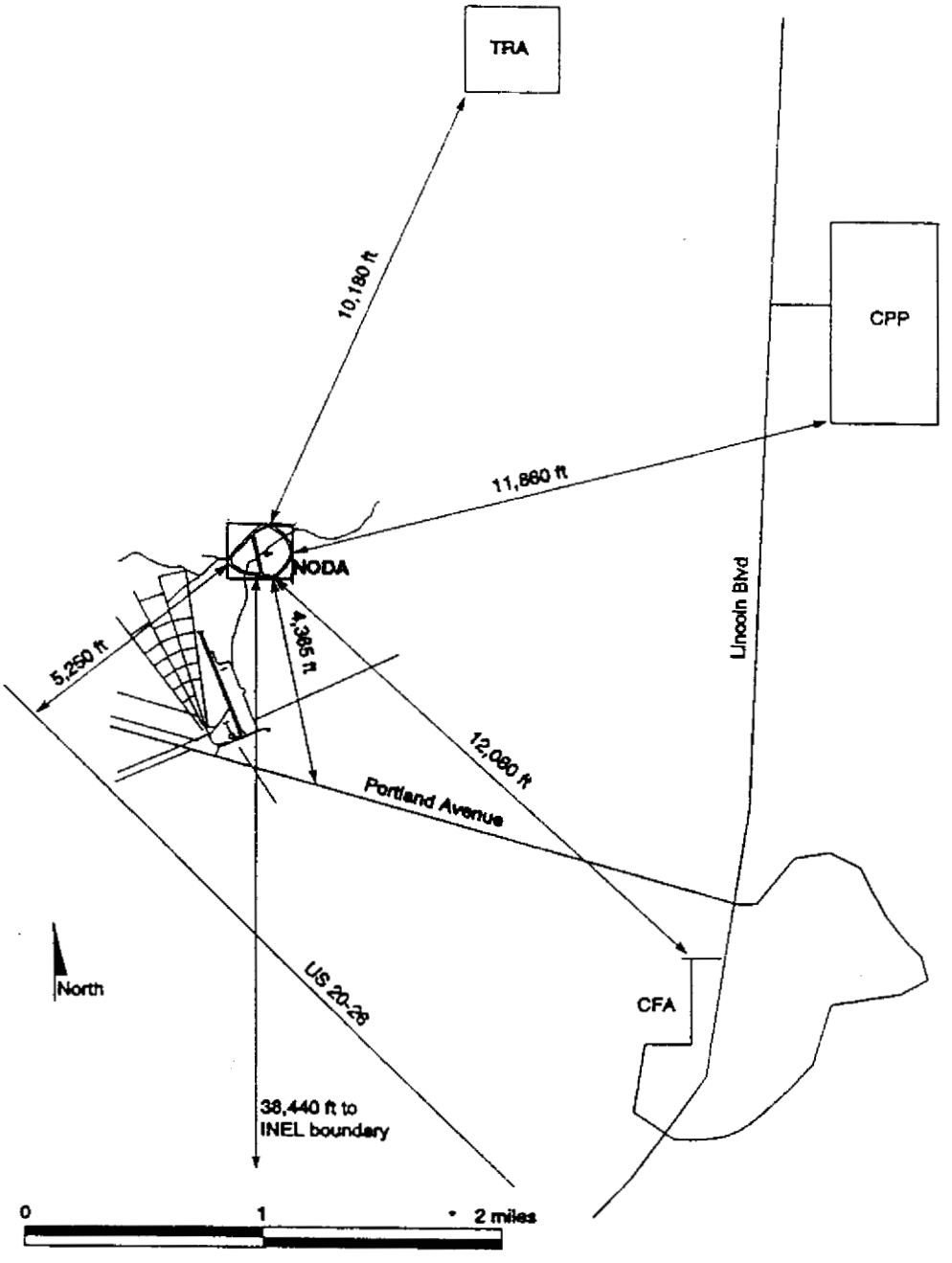


Figure 1–2. Location of the NODA in Proximity to INEL Facilities

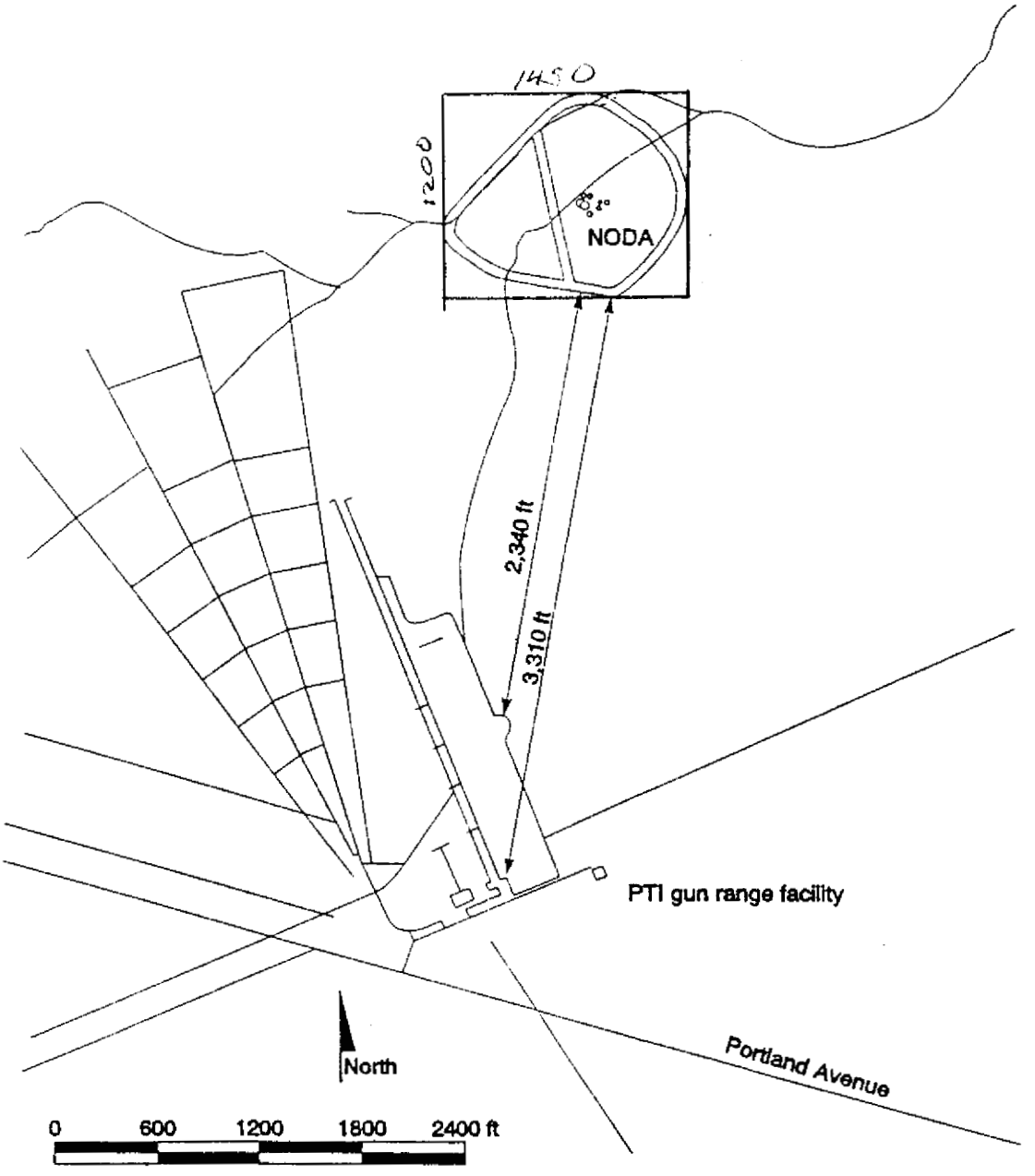


Figure 1–3. Location of the NODA in Proximity to the PTI Gun Range

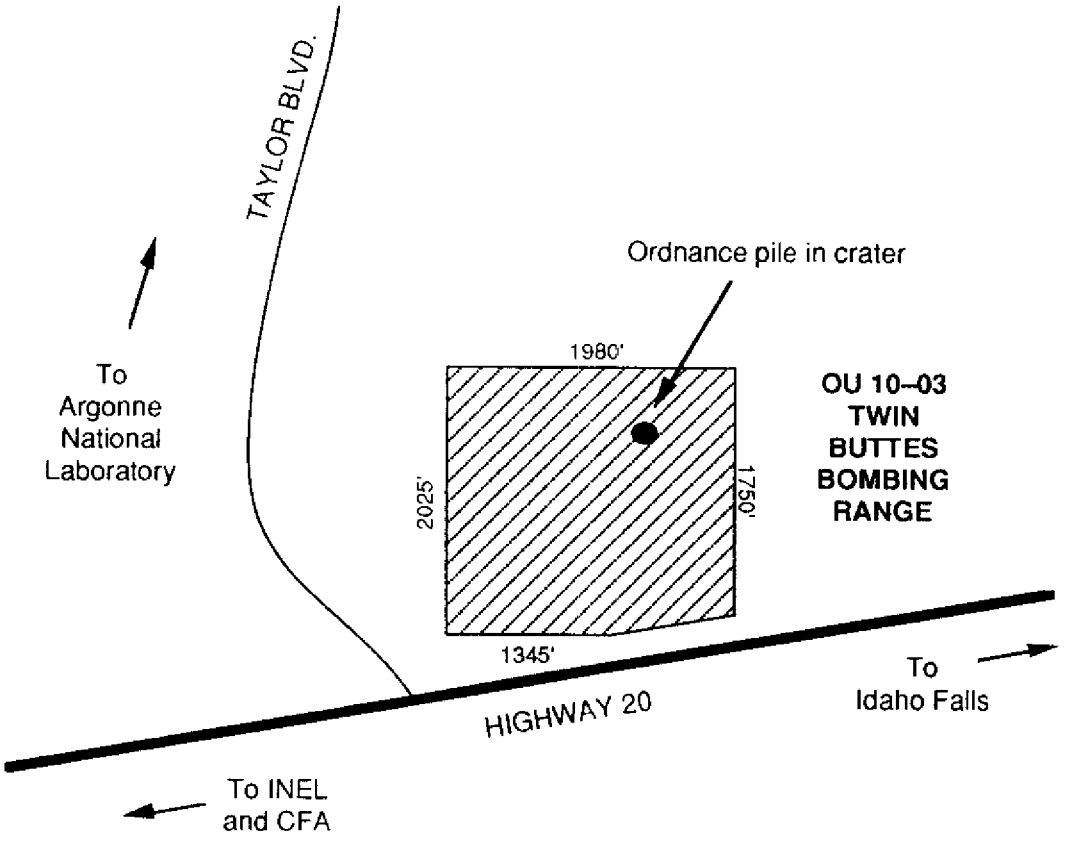


Figure 1–4. Twin Buttes Bombing Range

Four 16–inch Shells. The shells are located east of Lincoln Blvd. at approximately Milepost 17. The work involves demilitarizing the four 16–inch shells.

1.2 RAWP ELEMENTS

The RAWP describes how the remedial design will be implemented. The plan provides a detailed description of the remedial action work elements; a discussion of requirements and criteria that are used in judging the success of the efforts; a description of the approach to carrying out the work; a description of emergency operations and how they integrate into the MK–FIC Emergency Action Plan; and a description of how compliance with the regulatory requirements and the substantive requirements for this interim action will be achieved.

The schedule of the remedial action activities is also provided along with the estimates of the cost to carry out the remedial action and a description of the documents to be submitted as part of the removal action.

Four appendices are attached. Appendix A includes the material data safety sheets of chemicals planned for use on this interim action and chemicals that are anticipated to be encountered during the remedial activity. Appendix B includes the applicable procedures to the activities for conducting this ordnance removal action. Appendix C is the site–specific health and safety plan. Appendix D is the operations and maintenance plan.

1.3 ORGANIZATION SUMMARY

The field organization comprises a team of management personnel, explosive ordnance disposal (EOD) specialists, and magnetometer operators. The individuals who will be directing the efforts are identified in the chart in Figure 1–5.

This chart will be posted on site at the field office and at the command posts. As is indicated on the chart, the primary authority on site is the Project Superintendent. The Senior EOD Specialist will serve in the role in the absence of the Superintendent. Names and telephone and radio contact data will be added to the charts that are posted in the field.

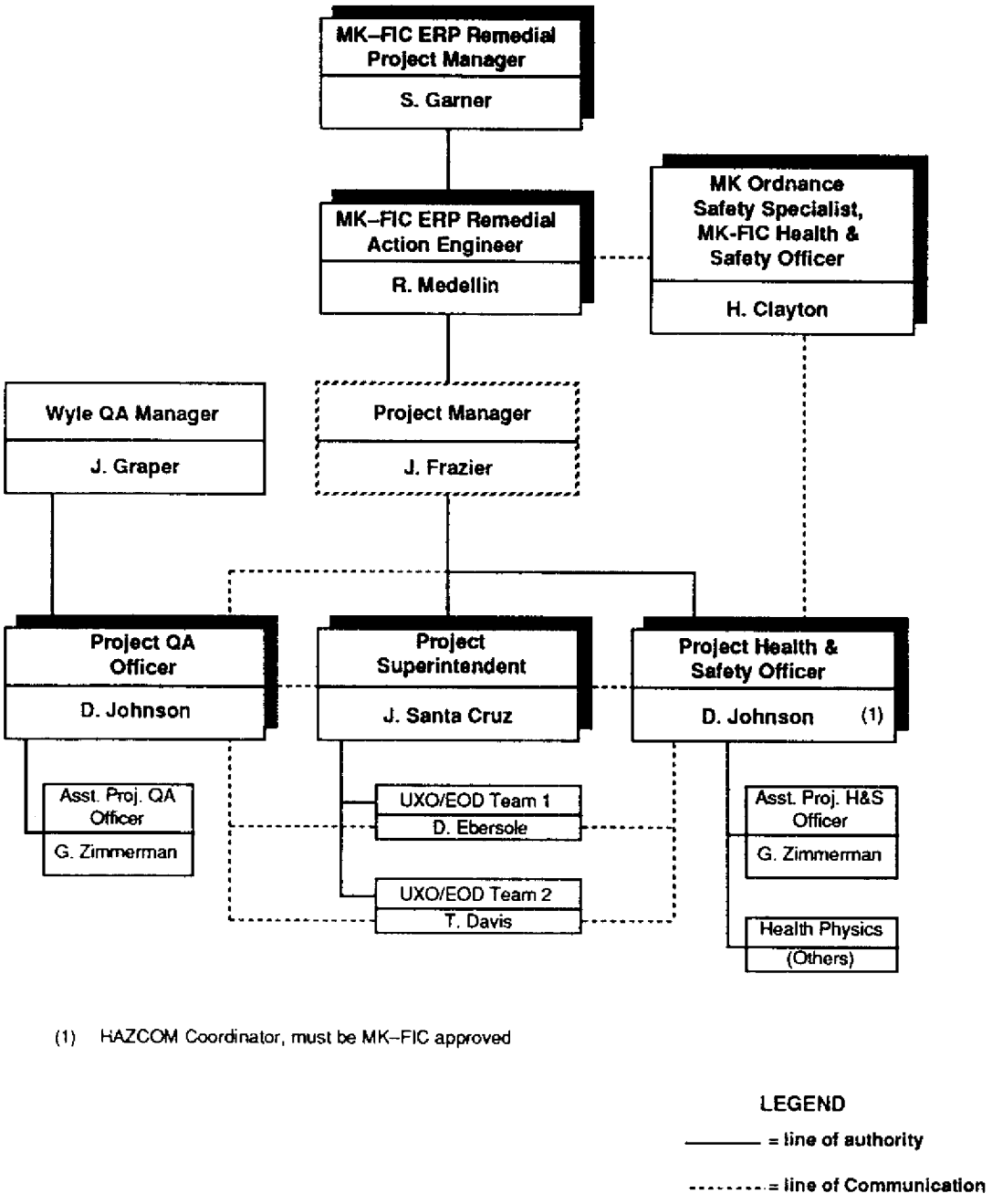


Figure 1–5. Project Organization

Section 2
WORK PLAN ELEMENTS

2.1 WORK PLAN ELEMENTS

The work to be performed on the project comprises the following major elements:

1. Preparing personnel and equipment in advance of the main effort
2. Mobilizing personnel and equipment on site
3. Conducting the search and disposal effort
4. Demobilizing from the site

Each of these is discussed in the subsections that follow.

2.2 PREPARATION OF PERSONNEL AND EQUIPMENT

The initial effort in the implementation of the on-site activity is the work of preparing the employees and equipment to perform the tasks. This effort is described in the subsections that follow.

2.2.1 Personnel Preparations

All project personnel will undergo INEL badging and orientation. A list of personnel who will be working on the project will be provided to the INEL Security Contractor one week in advance of the badging and orientation.

2.2.1.1 Badging

Badges will be obtained at the MK-FIC Security Office. The following information will be provided to the MK-FIC Security Office:

- Employee name, address, social security number, and date of birth
- Contractor: MK-FIC
- Subcontractor: Wyle Laboratories
- Subcontract Number: S-500992

2.2.1.2 Orientation and Security Briefing

Orientation and security briefings will be conducted as part of the badging process for those personnel who have not previously attended the MK–FIC four–hour orientation. This four–hour orientation will cover the following topics:

- INEL Site safety regulations
- Site evacuation signals and recognition of signals
- Health physics regulations
- Area restrictions
- Parking regulations
- Location of medical assistance
- Injury and accident reporting per DOE Form 5484X
- General employee training

Project personnel will complete the necessary security and safety forms at this time and view a security instruction video. The project has been designated a non–radiation–control project; however, basic instruction in radiation considerations will also be provided in the orientation.

Project personnel who have previously attended the orientation will attend the MK-FIC refresher orientation.

2.2.1.3 Archeological Training

The orientation for all project personnel will include a one–hour briefing through MK–FIC on area archeology considerations and the reporting of antiquities discoveries. The Project Manager, Project Superintendent, and EOD Leadmen will receive an additional one hour of training in archeology topics. This training is not required for those personnel who have received the orientation within the past 12 months.

2.2.1.4 Site Specific Orientation on Unique Hazards

Following orientation indoctrination, all of the project personnel will be instructed in the specific hazards to be found in the action areas.

2.2.1.5 Training to Applicable Plans and Procedures

Recognizing the increased risks in the work on this project (environmental and explosive considerations), particular emphasis is placed on safety training. Employees will be required to complete the 40-hour training prescribed in OSHA CFR 1910.120, Paragraph (e)(2), "Hazardous Waste Operations and Emergency Response" and the three days of field experience specified therein. Certificates of completion will be provided to the participants. Employees will not be permitted to work without having completed this training.

The Project Manager, Project Superintendent, and EOD Leadmen will be required to complete the additional eight hours of supervisor training prescribed in 1910.120, Paragraph (e)(3). Certificates of completion will be provided to the participants.

EOD personnel will be graduates of the Naval Explosive Ordnance Disposal School. EOD Supervisors will have a minimum of 10 years military EOD assignments and a minimum of five years in a supervisory position.

Site specific safety training will be provided by Wyle to the project employees in the following topics:

- Safety Analysis Report
- Site Specific Health and Safety Plan
- Hearing protection
- Fire prevention
- Inspection and use of PPE
- Work practices to minimize risk
- Safe use of equipment
- Recognition of symptoms of over exposure to the elements
- Names of responsible site safety personnel

- Responding to emergencies
- Evacuation plans
- Tailgate (daily site safety) meeting requirements
- Weekly safety meeting requirements
- Emergency procedures
- Buddy (two man) rule
- Flora and fauna hazards
- Eating and drinking precautions
- Location and use of eyewash stations
- Sanitation

The project personnel shall be trained by Wyle to the Site Specific Environmental Safety and Health Plan and Quality Assurance Program to ensure their understanding of the contents and requirements of the plans. Employees must sign off that they have read, understand and agree to the Site Specific ES&H Plan.

2.2.1.6 Medical

A medical surveillance program will be installed as prescribed in the Site Specific ES&H Plan. All project personnel will be given a physical in accordance with the requirements of 29 CFR 1910.120 prior to mobilizing on site. The medical examination will be evaluated by a licensed occupational physician. Medical records will be available for review upon request.

2.2.1.7 Certification and Documentation of Training

Certifications on project employee qualifications and training will be retained in the project office files as QA records and will be submitted as vendor data. Credentials and certifications retained in the file include the following:

- Certificate of completion of the 40–hour OSHA Hazardous Waste Operational and Emergency Response and/or the eight–hour refresher course (hazardous waste operational response, general training for all personnel)

- Certificate of completion of the eight–hour OSHA Management and Supervisor instruction (supervisors only)

- Certificate of completion of the four–hour site–specific hazards instruction (all personnel)
- Certificate of completion of EOD training at Indian Head, Maryland training facility (EOD personnel only)
- Copy of EOD Supervisor's resume
- Certificate of completion of eight–hour training in CPR and first aid (all personnel)
- Commercial Drivers' License (truck drivers)
- Heavy equipment operators' certificate (heavy equipment operators)
- Hazardous materials transportation credentials (hazardous material shipper)
- Physical exam records

Credentials in the form of blaster licenses and the information required by OSHA 29 CFR 1926.901 will be submitted to obtain approval from DOE of three people to serve as "powdermen" (blasters) on this project (reference ID Appendix 0550, Subpart III–I, Paragraph 3.1.3.C).

2.2.1.8 Construction Safe Work Permits

A Construction Safe Work Permit (CSWP) (reference Figure 2–1) will be prepared and processed to govern all field activities. The CSWP ensures to the INEL landlord and the MK–FIC Safety Officer that all safety requirements have been identified and will be followed during that particular field activity.

The CSWP will be submitted by noon the Thursday prior to the following week's activity, or two work days prior to a special activity. The CSWP will be supplemented with a safety risk analysis form (reference Figure 2–2) describing the particular hazards of the task.

US DEPARTMENT OF ENERGY
IDAHO OPERATIONS OFFICE

ATTACHMENT IX

Rev. _____ Date _____

CONSTRUCTION SAFE WORK PERMIT

ID-F-5480.1H
(Rev. 10-86)
Ref: ID-5480.1 Chap. IX

CSWP No. _____ Preprint No. _____

Category I ☐
Category II ☐
Other ☐

SECTION I - TO BE COMPLETED BY CONSTRUCTION SUPERVISOR

Contr. Co. Name	Job Location	Date and shift work is to be done, specify hours Date
Contr. Supt. Name	Project Number:	Project Title:

Description of Work: _____

1 Associated Hazards: _____

Name of Workers/Subs	Employee ID No.	2 Briefing	2 Resp. Training	2 Rad. Worker	For Radiological Work Only: 3 Accum. Exposure This Week	4 Allowable Exposure This Job	5 Dosimeter Reading: Initial	Limit

SECTION II - TO BE COMPLETED BY HEALTH PHYSICS FOR CONSTRUCTION CONTRACTOR PERSONNEL

6 Radiation Zone I,_____ Zone II,_____ Zone III,_____ ☐ See attached radiation survey ☐ Not applicable

7 Contamination
__Alpha α
__Beta β
__Gamma γ
__Airborne
__Surface (dry)
__Liquid

8 Monitoring of Area and Dosimetry Requirements
__At Start of Job
__Intermittent
__Continuous
__On Completion of Job
__Not Required

__Gamma Dosimeter
__Audible Dosimeter
__Neutron Dosimeter
__TLD
__Other

_____

HP Approval Signature

9 Protective Requirements

HEAD
☐ Safety Glasses
☐ Chemical Goggles
☐ Face Shield
☐ Ear Protection
☐ Rubber Hat
☐ Hard Hat
☐ Hood
☐ Other (State): _____

HANDS
☐ Cotton
☐ Cotton Liner
☐ Rubberized
☐ Latex
☐ Leather
☐ Other (State): _____

OTHER
☐ Coveralls
☐ Coveralls, Anti-C
☐ Coveralls, Magenta
☐ Acid Suit
☐ Safety Belt
☐ Life Line
☐ Other (State) _____

FEET & LEGS
☐ Shoe Covers, Scuff
☐ Booties, Plastic
☐ Boots
☐ Other (State) _____

BREATHING EQUIPMENT
☐ Half Face Respirator
☐ Full Face Respirator
☐ Air Line
☐ Self Contained Air Apparatus
☐ Hood (Air Line)
☐ Vortex Cooler
☐ Combination Canister
☐ Organic Canister
☐ HEPA Canister
☐ Other (State): _____

SECTION III - TO BE COMPLETED BY CONSTRUCTION SAFETY REP.

SYSTEM REQUIREMENTS/Permits Numbers
10 Electrical or Valve _____
Tag & Lockout _____
11 Rope Off & Post Area _____
12 Fire Watch _____
13 Excavation Permit _____
14 Outage Permit _____
15 Electrical Work Permit _____

16 Signature _____
Construction Safety Representative

SECTION IV - SPECIAL INSTRUCTIONS: _____

Area Supervisor Signature: _____

SECTION V - CONSTRUCTION JOB SUPERVISOR SIGNATURE: _____

Distribution:
Shift Plant Manager_____ HP Technician_____ Safety Engineer_____ Job Supervisor_____ Field Engineer_____
Return original complete with signatures to HP office for filing (See instructions on back of this Form)

Figure 2–1. Construction Safe Work Permit

JOB SAFETY ANALYSIS PLAN

1. Contractor/Subcontractor: _____

2. Construction Activity: _____ 4. Date of Analysis _____

3. Job Location: _____

5. WORK/TASK	6. POTENTIAL HAZARD	7. LOSS PREVENTIONMEASURES

8. Prepared By _____ Date _____

9. Subcontractor Management/MK–FIC Project Manager _____ Date _____

10. MK–FIC ES&H Reviewer _____ Date _____

Figure 2–2. Job Safety Analysis Plan

2.2.1.9 Landfill Permit

A Landfill Permit will be prepared and submitted to the MK–FIC Environmental Restoration Program (ERP) Remediation Action Engineer (RAE) for processing through Equipment Operations, CFA–660. The permit is submitted to obtain permission to use the Bulky Waste Landfill (north of the CFA and east of Lincoln Boulevard). A "Landfill Use Permit Card" will be obtained. A Form 130 "Nonradioactive Solid Waste Log" will be completed for each load deposited at the landfill. Additionally, Form 669(a) will be submitted for approval for each proposed transfer of waste.

2.2.1.10 Blast Permit

A permit shall be obtained from the DOE to carry on detonation operations in the work areas (detonations in place) and in the blast area (UXO transported for combined detonations). It is anticipated that only one such permit will be required over the duration of the project for doing the detonation work. The permit form is shown in Figure 2–3.

2.2.2 Equipment Preparations

As part of the mobilization effort the equipment and vehicles to be used on the project will be inspected at the facility of origin to ensure their cleanliness before being brought on site. An inspection report will be prepared and completed by the QA personnel at the facilities from which the equipment will be transferred. Upon arrival at the INEL Site the equipment will be inspected for adequacy and serviceability and the equipment will be exercised to ensure their proper functioning.

Backhoe, lift rigs, and associated rigging equipment that require load testing shall be load tested during the mobilization activity. The MK–FIC RAE shall be notified and a test scheduled two weeks prior to the first scheduled use of the lift equipment. The RAE, or his designee, will witness and verify acceptability of the equipment for performing lift operations. Certification tags shall be attached, when applicable, following successful completion of test.

:O F-107 (Rev. 01-86)
:O Appendix C§50 Subpart III)

U.S. DEPARTMENT OF ENERGY
IDAHO OPERATION OFFICE

AUTHORIZATION TO BLAST AT THE IDAHO NATIONAL ENGINEERING LABORATORY

TO: _____ Date: _____
Company/Contractor Field Supt.

_____
Site Address

Mr. _____, Badge Number _____, as your

designated blaster of _____ _____;
Company/Contractor Contract No.

(1) has furnished evidence which satisfies OSHA 1926.901 Blaster Qualifications;

(2) has been advised of contractual compliance responsibility with OSHA 1926 Subpart U, "Blasting and Use of Explosives," and Subpart III I of DOE-ID Standard Operational Safety Requirements and has a working knowledge thereof;

(3) acknowledges the following specific limitations:

_____

_____

_____

_____

_____

_____

(4) is hereby authorized to blast at the _____
Site Location

on the following day/dates _____

You are hereby advised that any significant violation of the prescribed standards or criteria can be cause for immediate stoppage of blasting operations and invalidation of this authorization

_____
Authorizing Safety Official
DOE-ID Operating Contractor

cc: Designated Blaster
INEL Security Patrol Operations, CF-606
ID Operational Safety Division
Operating Contractor Area Safety Manager

NOTE: The designated blaster shall maintain a copy of this authorization in his possession during all applicable work.

TTI 0500-99 March 11, 1986

Figure 2–3. Blasting Permit

2.2.2.1 Equipment List

Following is a list of the equipment that will be used on this project:

- Project Office trailer
- Office equipment
- Portable sanitary facilities
- Crew cab pickup trucks (4)
- Portable magazines
- Magnetometers, Whites TM–800
- Magnetometers, Schonstedt
- Magnetometer, Geometrics 822L
- Demolition equipment
- Common hand tools
- Non-sparking hand tools
- Portable radios
- First Aid equipment
- Personnel protective equipment
- Marking and flagging equipment
- Fire extinguishers
- Eyewash stations
- All Sky P–10 Lightning Detector

The equipment will be brought on site during mobilization. It shall be in place for the Operational Readiness Review (ORR).

2.2.2.2 Preparation, Calibration, Maintenance, Etc.

Preventive maintenance schedules will be posted at the Project Office for equipment requiring maintenance. Similarly calibration schedules will be posted at the Project Office for equipment and instrumentation requiring periodic calibration. An inventory of critical spare parts will be maintained to enable making equipment repairs quickly and efficiently to preclude disruptions in the work efforts.

2.2.2.3 Radios

The following personnel will be equipped with Motorola MT–1000 two–way radios:

- Project Superintendent
- Safety
- Leadman Team 1
- Leadman Team 2
- Blaster
- RAE or his designee

The radios will be brought on site with the start of the mobilization effort. They will be approved for use by the INEL Site Security Contractor once the frequency is verified. Functional checks of the radios will be conducted on a daily basis.

2.2.2.4 Explosives and Explosives Magazines

The primary explosive to be used will be C–4. Composition C–4 is a plasticized form of RDX which is ideally suited for use in UXO/OEW disposal operations. Special devices, such as conical and linear shape charge, will also be available. The explosive material to be used in conjunction with these devices will be C–4. Thermite will be the composition of choice for any special required burnout procedures. Electric blasting caps and primer cords are standard types used throughout the industry.

Explosives, blasting caps and demolition material will be stored in PTI–assigned magazines. In the unlikely event of an accidental detonation of explosives stored in the magazines, the Emergency Plan will be initiated. A thorough investigation will ensue and EOD personnel will search the area for any scattered OEW. If necessary, the area will be secured and remediation efforts will take place.

The demolition materials will be stored in their original shipping containers. Blasting caps will be stored separately from the basic explosive materials.

At no time will the net explosive weight exceed the magazine capacity prescribed by MK–FIC or the quantity distance limits defined in DOD 6055.9–STD, "DOD Ammunition and Explosive Safety Standards." The explosive materials will be stored in accordance with Wyle SOP 518–200–028 as modified to conform to PTI DOE-approved procedures.

Magazines will be closed and locked except for authorized operations. Under no circumstances will a magazine be left unattended when it is open.

2.3 MOBILIZATION

During the later part of May 1994 the Wyle team will begin mobilizing on-site in the series of events delineated below:

- Transfer and establish the project personnel in the field to receive, inventory, inspect and prepare all equipment and supplies.
- Submit written request for two–way radio use one week in advance of the start of the on–site movement and obtain user permit from Security. Provide certification of radio frequency.
- Delineate in writing to MK–FIC the power needs of the Project Office Trailer including planned usage, maximum loading, and duration of needs.
- Submit request for installation of telephone lines (three weeks prior to trailer installation).
- Move Project Officer Trailer into the space near the ICPP, Building 638 designated by MK–FIC
- Install power lines to trailer
- Checkout and make Project Office operational
- Schedule lifting and rigging equipment for load testing

Trailer installation will include sanitary facilities according to the distance of the installations from permanent facilities.

Following installation of the Project Office the installation effort will focus on mobilizing the work force and selected equipment into the Twin Buttes Bombing Range work area.

2.3.1 Site Coordination

When the Project Office is declared operational the base operations and support elements will be contacted to put necessary communication channels in place. Base operation and support elements include the following:

- First Aid
- Fire Protection
- Security
- Area Landlords

Area landlords will be informed a week before the work begins in their respective areas. Medical authorities will be advised in writing of the particular hazards that are characteristic of EOD and remediation operations. Operations personnel at the Test Reactor Area (TRA) and the Idaho Chemical Processing Plant (ICCP) will be notified prior to any detonation activities at the Naval Ordnance Disposal Area work site. Operations personnel at the Argonne National Laboratories – West will be notified prior to any detonation activities at the Twin Buttes Bombing Range work site. Operations personnel at the Naval Reactor Facility (NRF) will be notified prior to any detontation activities at the detonation range (blast site). Protection Technology Idaho (PTI) at the firing range will be notified prior to any field work or detonation activity at NODA.

2.3.2 Weather Report

The DOE weather agency will be contacted and the administrative mechanism for obtaining daily weather reports will be established. The weather agency will be advised to notify the Project Superintendent or Project Safety Officer of pending storms and again when the storm comes within a five–mile radius of the area.

2.3.3 Operational Readiness Reviews

In preparation for the Operational Readiness Review, Wyle Laboratories will complete the following:

- Checkout of the Project Office
- Review of project files for presence of employee certifications/training
- Library of pertinent documents including:
  - — Operations Procedures
  - — Site Specific ES&H Plan
  - — Facilities Plan
  - — Design Criteria
- Review of equipment calibration schedule
- Check out of communications
- Review of project files for presence of all required forms
- Permits as required

To implement the ORR Wyle Laboratories will provide documentation and/or certificates for accomplishing the following:

- Review of employee certifications
- Inspection of the Project Office
- Inspection of equipment to be used
- Inspection of PPE
- Review of medical examinations
- Review of operations approach
- Review of operations particulars in each area
- Inspection of the blast area
- Review of magazine accountability procedures
- Review of blasting procedures
- Review of permits

2.3.4 Mobilizing into an Area

After the general mobilization is complete, mobilization into the work areas will be accomplished. The first step involves surveying the area to establish the optimum locations for the following:

- Emergency evacuation routes
- UXO warning signs
- Safest entryway into the exclusion zone
- Command post vehicle
- Personnel break area
- Sanitation facilities

A brief report describing the general condition, e.g., density of shrubs, and grassy areas, within the area boundaries and in the area immediately outside of the boundaries will be prepared. Adjacent land space, areas not specifically involved, will not be disturbed.

UXO warning signs will be posted and a map of the area showing emergency evacuation route will be posted in the project office and at the command post. Also emergency response procedures and a chart of evacuation signals will be posted at the command post. It will be necessary to ensure that sufficient passenger capability is available in the vehicles at the site to enable evacuating all personnel from the area in the event an emergency evacuation is required.

2.3.5 Routine Daily Activities

Operations may be underway in three different areas simultaneously, i.e., in two of the three areas of interest and in the blast area. The work in each of the areas will be performed under the direction of the EOD leadman assigned in each. The Project Superintendent, Project QA Officer, and the Project Health and Safety Officer will oversee operations at each site.

The following tasks shall be performed on a daily basis:

- Notify the Warning Control Center (WCC) (526-1515) and other facilities of the start of work. Facilities include:

- CFA Dispensary (526-2356)
- INEL Fire Department (777-EMR#)
- INEL Ambulance Service (777-EMR#)
- PTI Security (526-2321)
- Facilities Adjacent to the Work Site (TBD)
- CFA DOE Facility Manager (Rod Taft) (526-8838)
- Test Reactor Area
- Idaho Chemical Processing Plant
- Naval Reactor Facility
- Argonne – West

- Get weather briefing from the WCC

- All personnel working on site shall sign in at the field office at the start of the day.

- Project Superintendent shall give a safety briefing as the first activity of the day. All project personnel shall attend.

- Establish the command posts as the first step in the daily activation of the areas where the removal work is underway.

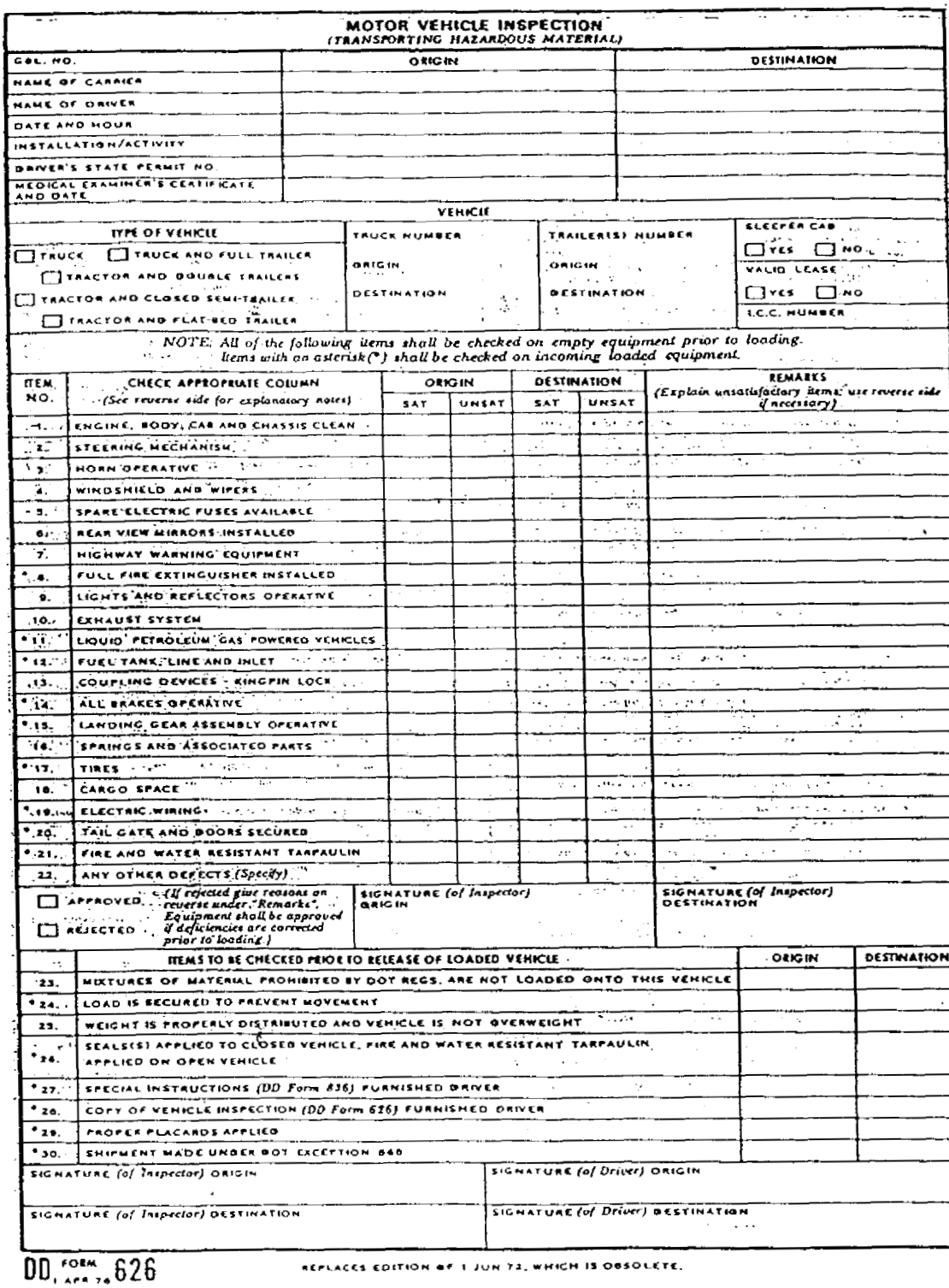
- Inspect and perform functional check on all equipment as directed by the EOD Leadman.

- Conduct a walk–around inspection of all vehicles and document results on the Form DD 626 shown in Figure 2–4.

- Verify proper functioning of the radio and telephone communications.

- Check the radio initially in the morning and again in the afternoon to verify proper operation.

- EOD Leadman make entries into the area logbook during the course of the day presenting results of activities.



MOTOR VEHICLE INSPECTION
(TRANSPORTING HAZARDOUS MATERIAL)

GBL. NO.	ORIGIN	DESTINATION
NAME OF CARRIER		
NAME OF DRIVER		
DATE AND HOUR		
INSTALLATION/ACTIVITY		
DRIVER'S STATE PERMIT NO.		
MEDICAL EXAMINER'S CERTIFICATE AND DATE		

VEHICLE

TYPE OF VEHICLE	TRUCK NUMBER	TRAILER(S) NUMBER	SLEEPER CAB
☐ TRUCK ☐ TRUCK AND FULL TRAILER ☐ TRACTOR AND DOUBLE TRAILERS ☐ TRACTOR AND CLOSED SEMI-TRAILER ☐ TRACTOR AND FLAT-BED TRAILER	ORIGIN	ORIGIN	☐ YES ☐ NO
	DESTINATION	DESTINATION	VALID LEASE ☐ YES ☐ NO
			I.C.C. NUMBER

NOTE: All of the following items shall be checked on empty equipment prior to loading. Items with an asterisk(*) shall be checked on incoming loaded equipment.

ITEM NO.	CHECK APPROPRIATE COLUMN *(See reverse side for explanatory notes)*	ORIGIN SAT	ORIGIN UNSAT	DESTINATION SAT	DESTINATION UNSAT	REMARKS *(Explain unsatisfactory items; use reverse side if necessary)*
1.	ENGINE, BODY, CAB AND CHASSIS CLEAN					
2.	STEERING MECHANISM					
3.	HORN OPERATIVE					
4.	WINDSHIELD AND WIPERS					
5.	SPARE ELECTRIC FUSES AVAILABLE					
6.	REAR VIEW MIRRORS INSTALLED					
7.	HIGHWAY WARNING EQUIPMENT					
*8.	FULL FIRE EXTINGUISHER INSTALLED					
9.	LIGHTS AND REFLECTORS OPERATIVE					
10.	EXHAUST SYSTEM					
*11.	LIQUID PETROLEUM GAS POWERED VEHICLES					
*12.	FUEL TANK, LINE AND INLET					
13.	COUPLING DEVICES - KINGPIN LOCK					
*14.	ALL BRAKES OPERATIVE					
*15.	LANDING GEAR ASSEMBLY OPERATIVE					
16.	SPRINGS AND ASSOCIATED PARTS					
*17.	TIRES					
18.	CARGO SPACE					
*19.	ELECTRIC WIRING					
*20.	TAIL GATE AND DOORS SECURED					
*21.	FIRE AND WATER RESISTANT TARPAULIN					
22.	ANY OTHER DEFECTS *(Specify)*					

☐ APPROVED ☐ REJECTED *(If rejected give reasons on reverse under "Remarks". Equipment shall be approved if deficiencies are corrected prior to loading.)*

SIGNATURE *(of Inspector)* ORIGIN

SIGNATURE *(of Inspector)* DESTINATION

	ITEMS TO BE CHECKED PRIOR TO RELEASE OF LOADED VEHICLE	ORIGIN	DESTINATION
23.	MIXTURES OF MATERIAL PROHIBITED BY DOT REGS. ARE NOT LOADED ONTO THIS VEHICLE		
*24.	LOAD IS SECURED TO PREVENT MOVEMENT		
25.	WEIGHT IS PROPERLY DISTRIBUTED AND VEHICLE IS NOT OVERWEIGHT		
*26.	SEALS(S) APPLIED TO CLOSED VEHICLE, FIRE AND WATER RESISTANT TARPAULIN APPLIED ON OPEN VEHICLE		
*27.	SPECIAL INSTRUCTIONS *(DD Form 836)* FURNISHED DRIVER		
*28.	COPY OF VEHICLE INSPECTION *(DD Form 626)* FURNISHED DRIVER		
*29.	PROPER PLACARDS APPLIED		
*30.	SHIPMENT MADE UNDER DOT EXCEPTION 868		

SIGNATURE *(of Inspector)* ORIGIN	SIGNATURE *(of Driver)* ORIGIN
SIGNATURE *(of Inspector)* DESTINATION	SIGNATURE *(of Driver)* DESTINATION

DD, FORM 1 APR 74 626 REPLACES EDITION OF 1 JUN 72, WHICH IS OBSOLETE.

Figure 2–4. Motor Vehicle Inspection Form

- Project Superintendent record data and information in the project logbook on the activities and accomplishments of the day.

- QA Officer monitor activities in the work areas according to tasks being performed.

- Project Safety Officer will continually monitor activities in the work areas according to tasks being performed.

- Project Superintendent inspect each of the activity areas at least once each day.

- Verify Safe Zones

2.3.6 Daily Project Briefing

The Project Superintendent or the Safety Representative shall each day, at the beginning of each work shift, conduct and document a project meeting to discuss potential safety problems and solutions and changes in operations, and provide the forum for a communication exchange among site personnel. Briefings will be conducted using the Plan of the Day Checklist and all personnel will sign the form indicating attendance. Briefings will include:

- Work to be accomplished
- Special instructions
- Potential and expected hazards
- PPE levels
- Description of the area
- Daily operation and schedules
- Methods to be used
- Ordnance expected
- Communications/signals
- Accident/incidents
- Precautions to be taken
- Two man rule
- Environmental issues

- Personnel responsibilities
- Emergency procedures for spill, fire, detonation, personal injury
- Drug and alcohol abuse

2.3.7 Weekly Safety Meeting

A formal safety meeting will be conducted by the Project Superintendent each Wednesday afternoon during the program. Employees shall sign the form shown in Figure 2–5 confirming their attendance. These forms will be retained in the project files as required in 29 CFR 1910.120 and 1910.20.

2.4 UXO REMOVAL ACTIVITIES

The work of cleaning the two areas and demilitarizing the four 16–inch shells prescribed by this removal action will be performed by two EOD teams. The teams will work independently in their assigned areas. Both teams will begin their effort in the Twin Buttes Bombing Range area. However, as a safety factor, the teams respective work areas will be separated by a minimum of 1250 feet whenever an item has been positively identified as UXO containing high explosives. After June 30, Team 2 will demobilize from the Twin Buttes Bombing Range and mobilize in the Naval Ordnance Disposal Area to commence search and removal activities.

Every effort will be made to detonate the located UXO as it exists in place. However, recognizing that it may not always be possible to detonate the UXO in place because of structures within the proximity of the UXO, an area is established in which "safe–to–move" ordnance can be detonated.

Assuming the population of UXOs in each of the areas is relatively the same, the procedure for clearing the areas is essentially the same for all areas. The generic clearing and removal process is described in detail in the subsections that follow.

2.4.1 Marking Work Area Boundaries

A map showing the exclusion zone, the contamination reduction zone, and the support zone will be developed for each area. The maps will show the area access control points and the area boundaries. The boundaries will be clearly marked with stakes painted with red fluorescent paint or engineer tape.

WYLE/INEL
UXO/OEW Remediation

WEEKLY SAFETY MEETING
ATTENDANCE ROSTER

Date: _____ Subject(s) _____

Time: _____

Location: _____

ATTENDEES:

Name (print)	Signature	Social Security Number	Employer

WYLE LABORATORIES

Figure 2–5. Safety Meeting Attendance Record

2.4.2 Initial Visual Investigation

An initial visual inspection will be conducted by the EOD personnel. From this inspection, access routes which will facilitate the in and out movement of personnel and equipment and the emergency evacuation of the area will be defined. Similarly, the most advantageous direction of the sweep lanes will be determined. Material items and flora which must be moved to establish sweep lanes will be identified and removed.

2.4.3 Removal of Material and Selected Vegetation

Plants, materials, scrap UXO and UXO fragments identified for removal in the initial visual investigation will be removed, prior to conducting sweeping operations. Material removed will be taken to the CFA Landfill. Scrap UXO and UXO fragments will be demilitarized, surveyed, and released prior to being taken to the CFA landfill. All materials removed from the area will be described in the project logbooks.

The site boundaries must be marked and work zones established to permit the magnetometer searches. No shrubbery or vegetation will be cut or removed unless absolutely necessary for the safe conduct of the search. The vegetation identified to be removed will be examined by the EOD Leadman for signs of UXO before removal of the shrubbery is undertaken. The EOD Leadman shall make certain that cutting surfaces of hand tools are maintained sharp to ensure that vegetation is cut and not pulled. Plants will be cut at a point approximately six (6) inches above ground. Flora will be cleared as required for the safety of those personnel involved in the UXO search and clearing action.

2.4.4 Establishing Sweep Lanes

The EOD Leadman may begin configuring and layout out the sweep lanes after the initial visual investigation and removal of material and selected vegetation which may interfere with the sweep lanes. The length of the lanes will vary depending upon the features of the terrain but the stakes and string lines marking the lanes will be laid out by the technicians to be approximately five feet wide. Sites where it is not practical to completely section off the area prior to conducting the inspection will be sectioned off in smaller units at the discretion of the EOD Leadman. When possible the area will be sectioned off in two–acre units. QA acceptance of the sweep lanes is required prior to proceeding with the visual search.

2.4.5 Visual Search

Once three or more sweep lanes are established, the visual search can begin. The search team, consisting of EOD technicians and magnetometer operators, will proceed down their assigned lanes and visually and electronically search for UXO/OEW and debris. A Schonstedt GA52C or the Geometric G822L metal detector will be used in this initial search. When a UXO/OEW is located on the surface, a red flag marker will be placed adjacent to the item. Below ground indications isolated by the magnetometer will be marked using yellow flags for later review and disposition.

UXO/OEW will not be moved during this phase of work. Once the technicians have completed a lane they will move on to the next assigned lane until the entire grid has been searched. All surface UXO/OEW will be positively identified and the status of the item determined (unfired, dud, inert, etc.). Potential special hazards such as fragmentation, ejection, white phosphorous, etc., will also be noted. The identification, condition and associated hazards will be verified by at least one other EOD technician. The type, size, condition and location details on each item will be recorded in the daily log book.

When a hazard is encountered that cannot be immediately recognized or classified, the sweep will halt. The item will be inspected by the nearest EOD technician. If, from a closer inspection, the item cannot be positively identified, the item will be cordoned off; and the Project Superintendent and the RAE notified. Unknown UXO will be photographed and researched to define a course of action.

Before moving or countercharging any surface UXO, it will be fully characterized using applicable technical manuals, and if necessary, active EOD units and other technical EOD resources to identify the type, sensitivities, and hazards associated with UXO.

The EOD technician shall visually, and to the extent possible, physicially evaluate the condition of the UXO, in particular the type and condition of the fuze.

The fuze safe/arm status shall be established before handling the UXO. If the fuze condition is questionable, the fuze shall be considered armed.

When the visual search has been completed, the EOD Leadman will direct that the surface be cleared of remaining metal debris. QA will have access to the visual search data before proceeding with the geophysical search. QA will advise the Project Superintendent of any discrepancies.

2.4.6 Geophysical Search

The geophysical search follows immediately after the visual search. The geophysical sweep will be directed by the EOD Leadman and conducted in a manner similar to that used in the visual search using the Schonstedt GA52C.

The EOD Leadman will carry a map of the area. The map will be sectioned off into uniform grids that are defined in a numeric sequence. Progress and efficiency of the search effort will be monitored and plotted on the map. A magnetometer signal, the need to move a surface UXO, excavation needs, snakes and other such events may cause a halt in the line and the search. The search will be resumed at the direction of the EOD Leadman when the problem has been resolved and the discovery identified and classified. Yellow flag locations posted during the visual and geophysical search will be investigated using a Schonstedt GA52C or White's Eagle Spectrum detectors. The higher resolution of these systems is necessary in resolving the yellow flag situations. Yellow flag situations which cannot be resolved without excavation will be further investigated after completion of the geophysical search in that grid.

2.4.7 Marking

The search teams will carry flags (Figure 2–6) to mark ordnance, explosive particulate deposits and subsurface anomalies. Red flags for surface items (placed near the item to avoid disturbing the item); and yellow flags to identify subsurface targets requiring excavation. The flags shall not be removed until each has been thoroughly investigated and cleared.

2.4.8 Location Logging

The EOD Leadman at each area will establish a bound field logbook for the area. Grid location of every UXO/OEW and flags shall be recorded in the book. Information in the note book will be reported to the Project Superintendent at the end of each work day. This information will

be used to compile the weekly subcontractor report. Areas of visually contaminated soils will be noted in the field logbooks. Following the removal of any ordnance, the contaminated soil locations will be surveyed by MK–FIC. Maps showing contaminated soil locations will be included in the remedial action report.

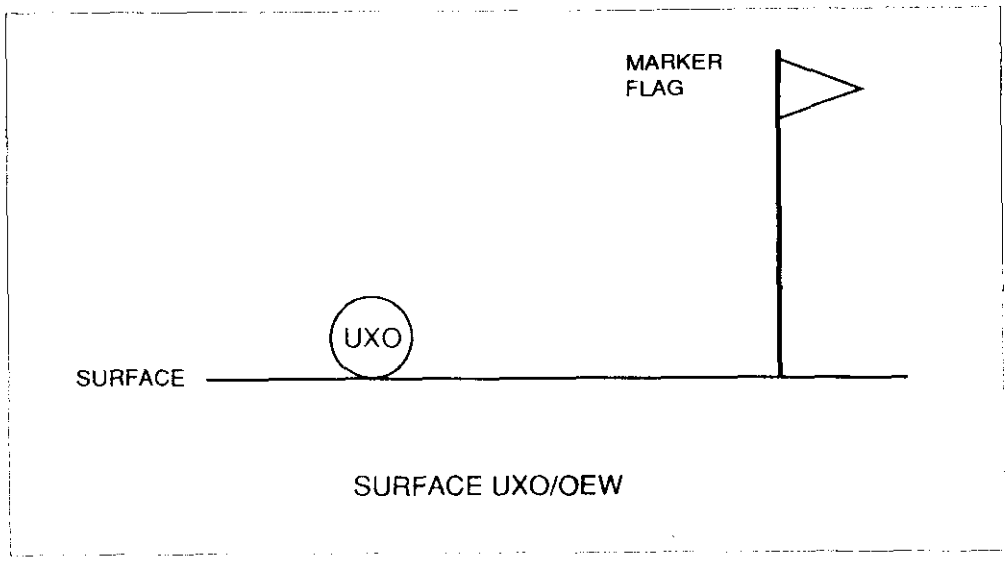
2.4.9 UXO/OEW Identification

Every UXO/OEW will be identified as to size, type and condition of the ordnance, e.g., 5-inch rounds, 16-inch projectiles, 100-lb., 500-lb. bomb, practice, incendiary, high explosive, dud, etc. These data shall be recorded in the field logbook. A field reference library will be maintained in the field office for researching and verifying ordnance identification features.

All UXO shall be fully characterized using the applicable technical manuals, and if necessary, active EOD units and other technical EOD resources to identify the type, sensitivities, and hazards before handling, moving, or countercharging UXO. The EOD technician shall visually, and to the extent possible without moving the UXO, physically evaluate the condition of the UXO, in particular the type and condition of the fuze. The fuze safe/arm status of the UXO shall be established before handling the UXO. If the fuze condition is questionable, the fuze will be considered armed.

2.4.10 Investigatory Detonations

Investigatory detonations are not anticipated. However, if necessary, they will be performed on ordnance items only when there is a special need to determine if the UXO is a live, inert, or practice round or to establish the type of filler. Investigatory procedures include explosive removal of base plates, case fracturing, and nose plug removal. Conical, linear, flex linear shape charges, C-4 will be used depending on the particular circumstance. The type of UXO and the type of investigatory action required will determine the placement and type of explosive device and the charge size to be used. Alternatives to explosive methods are Thermite burn procedures and the 50 caliber Dearmer for case splitting of certain ordnance items. Wyle SOPs 518-200-011D, 518-200-012C, and applicable 60-series TMs will be used when conducting investigatory detonations. Investigatory detonations will be conducted in the same manner as on–site detonations, using the same reviews and controls specified in SOP 518–200–019C.



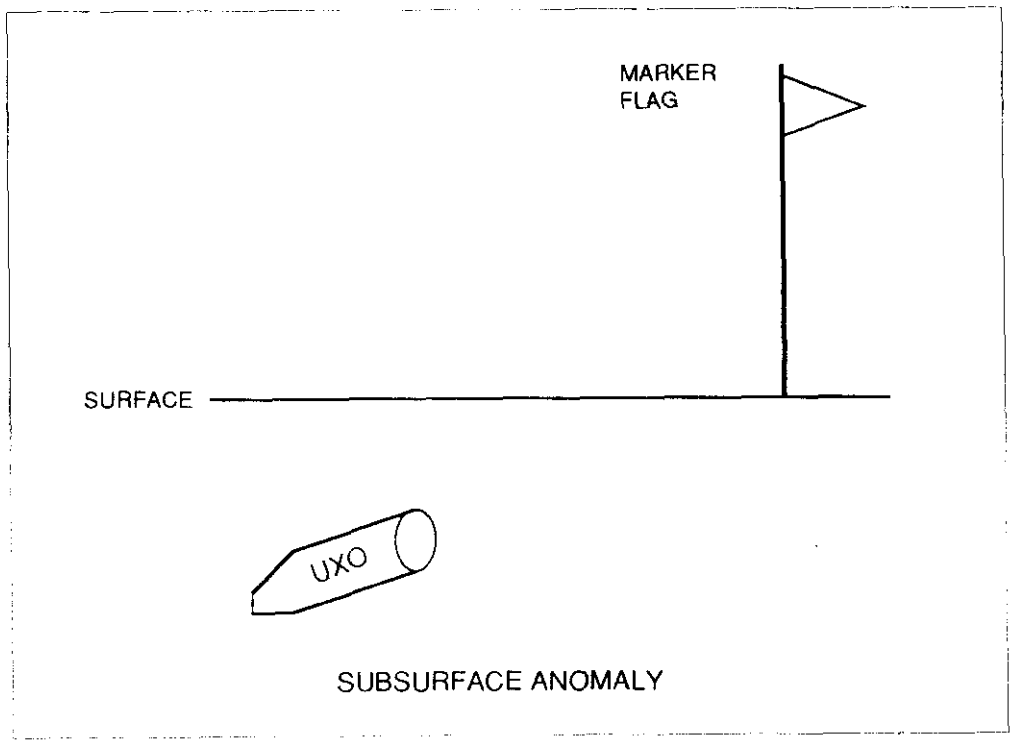


Figure 2–6. Marking

Protective measures shall be incorporated to minimize the risks of unpredictable high or low order detonations. Procedures such as sandbagging, tamping, placing the UXO in a pit or combinations of these will be used to contain blast energies and blast fragments and to prevent collateral damage.

2.4.11 UXO and OEW Excavation and Removal

The removal and excavation of UXO shall be limited to only those UXO that are no more than four feet below the surface or until the rock basalt base is encountered if no evidence of UXO entry into the basalt can be noted. Anomalies detected at a depth greater than four feet will be handled on a case-by-case basis following notification of the RAE, DOE, EPA and IDHW. Excavations to this depth are considered shallow depth UXO excavations. This and the soil composition on the INEL property dictates the manual excavation of soils using hand tools. The EOD Leadman will monitor all excavation operations. Individuals engaged in shallow depth excavations shall wear the PPE established by the Safety Officer to be appropriate for the particular operations. Non-sparking tools will be used during shallow excavation tasks.

A magnetometer will be used to approximate the size, depth, and orientation of the UXO. The length and width of the UXO will be extended a minimum of twelve inches. The EOD technicians will dig down until they are near the target from magnetometer indications. A garden trowel or gloved hands will be used to remove the remaining soil and to uncover and identify the UXO. When the item has been uncovered and identified using the same procedures as that for surface ordnance, it will be detonated in place unless the detonation may impact nearby facilities, structures or personnel. If there would be impacts and if it has been determined that the UXO can be safely handled and transported, it will be transported to the blast site for detonation. If results of the characterization are that safety cannot be ensured, the UXO will be detonated in place using the reviews and controls in SOP 518–200–19C. QA acceptance of the excavation activity shall be required before initiating the restoration activities.

2.4.12 OEW Collection

Pieces of explosive chunks will be collected by glove hand methods either during or after the geophysical search. Explosive chunks will be collected and staged in the exclusion zone, the total explosive chunk N.E.W. staged within a particular exclusion zone will not exceed 40 lbs. N.E.W. Staged explosive chunks will be disposed of during the next blasting activity.

2.4.13 Transportation of Explosives

The transportation of explosives on or off the INEL site will be accomplished in accordance with DOE/EV/06194, Rev. 6, "DOE Explosives Safety Manual" ID Appendix 0550, 49 CFR 172, 173, 176, and 177, and the Wyle Transportation Plan. Before transporting explosives on the site, the Project Superintendent will coordinate with Protection Technology Idaho Inc. (PTI) and obtain a PTI security escort. The drivers of vehicles transporting explosives will have in their possession a current state driver's license, a commercial drivers license and a medical examiners certificate of health in accordance with 49 CFR 391, Subpart B. Vehicles transporting demolition explosives, UXO or OEW will not exceed 35 mph. Drivers will be instructed in the proper use of fire extinguishers, explosive routes, emergency procedures, phone numbers and regulations pertaining to transportation of explosives on the INEL.

Vehicles used to transport explosives will be in good condition and fully operational and equipped with appropriate safety equipment, e.g., two fire extinguishers and first aid kits, and radios. Transportation routes approved for hauling explosives will be used. Only vehicles with separate cargo spaces will be used to transport explosives. Hauling in trailer–type vehicles will be strictly prohibited.

Placards will be installed on the vehicles indicating the presence of explosives on board and the type of explosives, e.g. 1.1, 1.2, 1.3 explosives as defined under DOT 49 CFR Part 177 Subpart C. Explosives will not be transported in the passenger compartment. Only the driver and a helper will be permitted on board the truck during transportation; and at no time will personnel be allowed to ride in the cargo section of a vehicle transporting explosives. Explosives will be transported during daylight hours in approved portable magazines. Blasting caps, primers, detonators, and fuzes will be transported separate from explosives in containers approved and designed for that purpose. Additional details on the transportation of explosives is provided in Wyle Procedure Number 518–200–024D.

2.4.14 Storage of Explosives

Explosives and demolition material, i.e., detonating cord, time fuze, blasting caps, fuze lighters, will be stored in their original containers or in dry, clean, properly marked and secured containers in permanent magazines provided by PTI for Wyle use. The magazine area will be kept in an organized manner devoid of trash. All combustible material will be removed within a 50

foot radius. Two 10BC fire extinguishers will be placed outside each magazine to extinguish grass files only. At no time will anyone on the INEL fight a magazine fire.

All explosives and demolition materials stored in the storage magazines will be accounted for using a magazine log sheet (Wyle Form 959–B) and a magazine stack card. These forms will be completed by one of the EOD Specialist prior to any item being placed in storage. Inventory accountability will be maintained. The code for securing entrance to the magazine will be provided to three people, the Project Superintendent, the EOD Specialist in charge of operations in the blast area, and a backup EOD Specialist. The magazine log will be secured in the Wyle Field Office. The Project Superintendent will designate in writing individuals having access to the magazine code. At no time will the net explosive weight exceed the magazine capacity or quantity distance limits.

Upon receipt, explosive items will be inspected. Each item will be inspected for damage or defect. If any damage is noted, the Project Superintendent will be notified.

Explosives shall be stored in stacks insofar as possible, and segregated by lot numbers. Stacks will be arranged so that containers are easily accessible and offer unobstructed circulation of air. A space of approximately six inches will be maintained between the stack and the magazine wall. Stacks will be raised off the floor using suitable dunnage to provide a ventilating space. Containers will be closed and securely fastened when in storage. Partially filled boxes will be marked to indicate the partially filled condition.

Additional details on the storage of explosives are presented in Wyle Procedure Number 518–200–028A.

2.4.15 Transportation of UXO/OEW

Before transporting UXO or OEW the Project Superintendent will coordinate with Protection Technology Idaho Inc. (PTI) to obtain a PTI security escort. Vehicles transporting UXO/OEW will meet the same exacting standards and requirements as vehicles transporting explosives. The transport will be accomplished in accordance with requirements in DOE/EV/06194 Rev 6 and ID Appendix 0550, and in Wyle Procedure Number 518-200-024D. Vehicles transporting UXO or OEW will not exceed 35 mph.

An EOD technician will accompany the driver whenever transporting UXO/OEW. He will

maintain constant surveillance of the load while in transit, being especially watchful for any unusual occurrences, or shifting of the load. The driver will have in his possession a current commercial driver's license and a qualifying medical examiner's certificate per 49CFR391.41 and TM 9-1300-206, and a current negative drug test will be on file.

The UXO/OEW will be secured to prevent movement during transportation. A layer of sand bags will be placed on the bed of the vehicle. The UXO will be carefully positioned in the vehicle bed, and supported by sand bags on each side. Whenever more than one UXO must be transported on the same vehicle the UXO items will be transported by alternating sandbags and UXO. UXO will be firmly secured to the vehicle using ratchet straps. The procedures in the DOE Hoisting and Rigging Manual will be followed where applicable when loading and securing UXO. Each instance of UXO movement will have to be addressed on a case by case basis as it is impossible to predict types or condition of ordnance that will be uncovered, or the types and condition of terrain that will be encountered. All equipment and containers that contact UXO or OEW will be made of non-sparking material.

2.4.16 UXO/OEW Detonation Process

Only qualified EOD personnel, personnel who have successfully completed the Naval E.O.D. School at Indian Head, Maryland, and those personnel authorized by the Project Superintendent will be allowed on the blasting range or area where disposal/detonation operations are in progress.

UXO/OEW detonation operations will be conducted in accordance with the details in Wyle Procedure 518-200-019C. This procedure reflects relevant parts of DOE ID Appendix 0550 and DOE/EV/06194, Rev 6. At least two EOD personnel will be present during all detonation operations and only INEL–approved and designated blasters or "powdermen" will conduct the detonations.

The Project Superintendent will notify and coordinate with the DOE-ID and MK-FIC on all detonation operations. He will ensure that notifications are made as prescribed in DOE-ID Standard Operational Safety Requirements, ID Appendix 0550 and that PTI is notified to ensure that no overflight of helicopters is allowed. This will be accomplished by notifying the WCC before any detonation. The WCC shall notify the PTI Security Force, the INEL Fire Department, and facilities adjacent to the detonation site, and then report to the Project Superintendent. Once verification of the notifications has been received the work will proceed.

UXO/OEW will be detonated in place when the situation allows. The prescribed quantity of explosives per TM 60A-1-1-31 will be used to ensure a complete high order detonation. The immediate area around the detonation site will be cleared of flammable materials and other materials that pose secondary hazards.

When UXO/OEW cannot be detonated in place, the UXO/OEW will be transported, as described in Paragraph 2.4.15, to the blast area. The center of the blast area will be clear of combustible materials to a distance of 200 feet. Only that UXO which has been determined by a consensus of EOD personnel to be safe to transport and only as authorized by the Project Superintendent will be transported to the blast area.

The blast site has been located two miles east of the Naval Reactor Facility (NRF). The site meets the quantity distance and blasting area requirements of AFR 127–100, T.O.11A–1–42, DOD 6055.9 Std. and DOE Explosive Safety Manual. The following blast area requirements have been met:

- 4000 feet from buildings and the INEL boundary
- Natural barricades such as hills or gullies are available. There is an existing blast crater approximately 25 feet deep. This pit will serve as a natural barricade.
- No combustible materials within 200 feet of the immediate blast area. Any existing material will be cleared before use.
- Safe, drivable roads for access and exit
- Free of RF hazards

UXO and ordnance materials awaiting destruction will be shielded from accidental detonation or ignition during demolition operations. They will not be stored at a distance less than interline distance from the material being destroyed as specified in the DOD Contractor's Safety Manual for Ammunition and Explosives, DOD 4145.26-M.

2.4.17 Disposal of Uncontaminated Waste

Bulky waste will be removed to the Bulky Waste Landfill. The materials determined recyclable by the EG&G of Idaho Property Control Unit will be recycled. All other waste will go to the sanitary landfill. Wyle will fill out a landfill user permit card for the Bulky Waste Landfill

and a permit for the sanitary landfill. The card will be in the possession of the depositor when depositing waste at the landfill. Combustible waste will be removed to the sanitary landfill. Deposits at the landfill will comply with Paragraph 2.2.1.9 of this document.

2.4.18 Demobilization

The last event in the set of on–site activities is the demobilization of the temporary facilities, equipment and personnel from the site. Electrical power and phone line disconnects will be requested. Temporary facilities will be moved off–site and the area will be cleared of all trash. Equipment will be inventoried, packaged and returned to the home office. Personnel will be processed through the INEL Security Office and security badges will be returned.

2.5 CONTROL MEASURES

All personnel shall check in with the field office prior to the start of each day's operations and again at the command post located in the support zone of the particular work site.

For control purposes, the work site will be separated into three zones of activity: the exclusion zone; the decontamination zone; and the support zone. The zones are defined as follows:

- Exclusion Zone (EZ) is the area where UXO/OEW is or could be present. All personnel entering this area will wear the PPE dictated by the IH for the particular operation in which the individual will be involved. An entry and exit point will be established at the periphery of the zone to regulate the flow of personnel and equipment in and out of the zone. No smoking, eating, drinking, or applying makeup will be allowed in this area.

- Decontamination Zone (DZ) is that area immediately at the boundary of the entry and exit point of the EZ. This area will be used to control entry and exit and decontamination of personnel and equipment exiting the EZ. Temporary decontamination facilities will be established in this zone.

- Support Zone (SZ) is the staging area for personnel and equipment that are supporting operations in the EZ. The support zone will include the site access control point, the command post, the equipment staging area, sanitary facilities, an area for visitors, and a shaded break area for site personnel.

Access to the areas will be controlled to protect against inadvertent entrance to a hazardous area to preclude exposure to explosive waste, UXO, and contaminated soils, and to guard against the accidental or purposeful removal of UXO off site.

A control point will be established in the support zone at the Command Post. A sign configured as shown in Figure 2–7 shall be posted at the control point. Personnel and equipment entering and exiting the site will be logged in and out through the control point.

The following steps shall be taken to control site access:

- The Warning Control Center will be notified on a daily basis prior to detonations (see Section 2.4.16)
- The number of personnel and equipment on–site will be kept to a minimum consistent with effective operations
- Control points will be established to regulate access
- Personnel and equipment will be logged in and out of the site
- Equipment will be decontaminated before releasing it from the site
- The UXO warning signs shown in Figure 2–8 will be posted on all sites. Warning signs will be posted at the access roads leading to the sites.

Personnel not required to be on site will not be allowed in the areas except with the special written approval of the Project Superintendent. Visitors will be required to have clearance from the MK-FIC RAE and the Project Superintendent and will be limited to the Support Zone. Any visitor needing access to the EZ or DZ shall be required to meet the requirements imposed on workers in the zone, e.g., 40-hour OSHA Training Class.

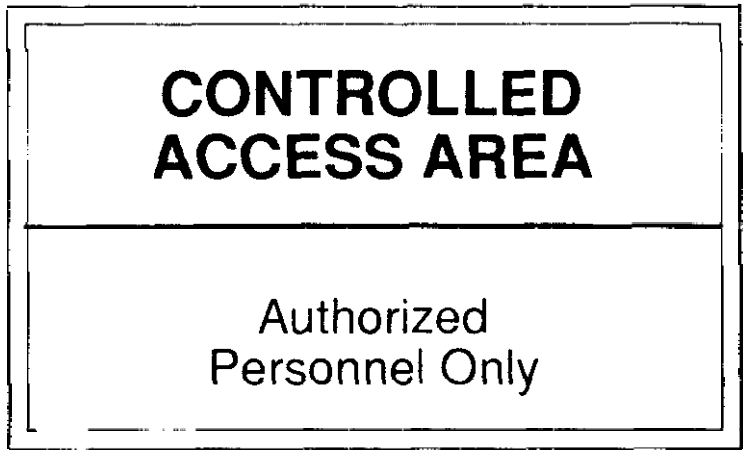


Figure 2–7. Control Point Access Sign

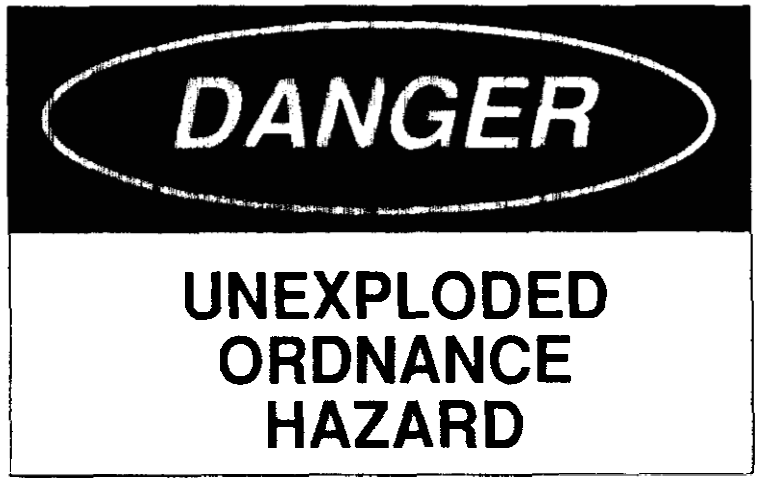


Figure 2–8. Warning Sign

Section 3
EMERGENCY OPERATIONS

3.1 INTRODUCTION

In circumstances requiring emergency response, Wyle Laboratories, as a subcontractor to MK-FIC, will perform under emergency conditions to the MK-FIC Emergency Action Procedure, dated April 15, 1994, or the most current version, and their own site-specific emergency operation procedures described in Section 3.7. The MK-FIC Emergency Action Procedure has been developed in accordance with the following DOE Orders:

- 500.3B Occurrence Reporting and Processing of Operations Information
- 5480.7A DOE Order and DOE–ID Supplemental Directive on Fire Protection
- 5500.1B Emergency Management System
- 5500.3A Planning and Preparedness for Operational Emergencies
- 5500.2B Emergency Categories, Classes, and Notification and Reporting Requirements
- 5500.10 Emergency Readiness Assurance Program

The MK–FIC procedure provides a plan of action that assures all MK–FIC and their subcontractor personnel are accounted for during an emergency. The procedure establishes the interface between MK–FIC and the Facility Landlord which, in the case of this interim action, is specific to the Central Facilty Area. The procedure also describes the actions MK–FIC takes in support of the Facility Landlord Emergency Action Plan.

As depicted in Figure 3–1, the chain of command for the emergency response organization flows from the Wyle Project Superintendent, or his designee as described in Section 3.2, to the on–site MK–FIC Remedial Action Engineer, to the MK-FIC Emergency Action Manager. The MK-FIC Emergency Action Manager, in turn, is responsibile to the Central Facilities Area Engineering Action Manager (FEAM) who reports to the Facility Emergency Director who reports to the DOE–ID Duty Officer.

EMERGENCY RESPONSE ORGANIZATION
CFA/INEL EMERGENCY PLAN

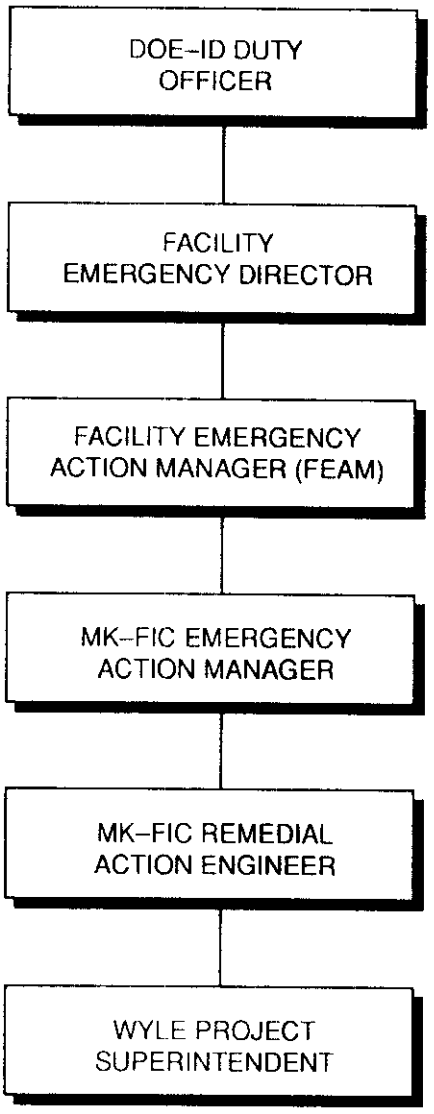


Figure 3–1. Emergency Response Chain of Command Organization
Reference: EG&G Idaho, Inc., Interim CFA/INEL Emergency Plan, Volume I, 1993

The MK–FIC Remedial Action Engineer's responsibilities, and likewise the Wyle Project Superintendent's responsibilities in support to MK–FIC, to the FEAM during an emergency include the following:

a. Serving as the specific representative between the CFA/INEL FEAM and the remedial action when the emergency originates at the remedial action.

b. Providing source term data and assisting Hazard Assessment Support Team in the calculation of source term, as necessary.

c. Assessing the impact of the emergency on facilities and related equipment associated with the remedial action.

d. Obtaining input from facility operations personnel from affected and unaffected facilities, as needed.

e. Maintaining an overview of emergency operations related to facilities and equipment associated with the remedial action.

f. Keeping a log of all communications and messages pertaining to the emergency.

g. Interfacing with Technical Support Team personnel on facility–related matters needing engineering support or on matters affecting facility safety.

h. Assisting FEAM as needed with recovery and reentry planning.

i. Assisting the Emergency Control Center (ECC) Manager in deactivating the ECC.

j. Completing a checklist to ensure that all responsibilities have been completed.

Although Wyle personnel will be trained to operate to the MK–FIC Emergency Procedure and the CFA/INEL Emergency Plan, the following sections describe Wyle's personnel roles, training, alarm response, and procedures unique to its operation.

3.2 PERSONNEL ROLES AND QUALIFICATIONS

Personnel on the Wyle Project Team that are key in the organizing and implementing of the responses to be instituted in emergency situations are the following:

- Project Manager
- Project Superintendent
- Project Safety Officer
- EOD Leadman

The primary on-site authority is the Project Superintendent. In his absence the Safety Officer will direct and command emergency response actions. Work crew efforts will be monitored by an EOD Leadman at one site and the Safety Officer at the other. These senior personnel will be responsible for emergency response action in situations originating at the work areas being remediated. The responsibilities of these personnel are delineated in the paragraphs that follow.

3.2.1 Project Manager

The Project Manager is responsible for the overall direction of the emergency response program and delegates authority for day-to-day emergency preparedness and response action direction to the Project Superintendent.

3.2.2 Project Superintendent

The Project Superintendent has the overall authority and responsibility in an emergency for the welfare and safety of all Wyle personnel, visitors, and subcontractor personnel over which Wyle has cognizance, wherever they may be working on the INEL; also for project facilities and equipment. The Project Superintendent will provide support in emergency events as directed by MK-FIC. He will be responsible for interfacing with on-site forces to establish lines of communication. He is also responsible for ensuring that Wyle personnel and subcontractor personnel comply with the directions of MK–FIC.

3.2.3 Project Safety Officer

The Project Safety Officer advises the Project Superintendent of the ES&H consequences of the emergency and makes recommendations for actions to be taken to mitigate the consequences. He is tasked with interfacing with other ES&H personnel to confirm the event, determining the magnitude of the event, and performing surveys/tests. He will also be responsible for coordinating and directing liaison efforts among Emergency Action, Medical, and Fire Department personnel. He is also charged with maintaining the Wyle Emergency Response Organization roster and with issuing current listings to MK-FIC.

The Project Safety Officer is responsible for day-to-day emergency preparedness activities. Under his direction, a file of all current evacuation plans will be maintained at the Project Office. He will direct the incorporation of updated plans into this procedure and disseminate the revised procedures, and ensure that project personnel are familiarized with the revisions and maintained current with the changes.

With the Project Superintendent and the EOD Leadman, he will share the effort of supporting the INEL during off-shifts, weekends and holidays in emergency situations or occurrences affecting Wyle. A list of personnel and schedule of assignments will be prepared by the Project Safety Officer and provided to MK-FIC.

3.2.4 EOD Leadmen

The EOD Leadmen are military-trained explosive safety experts. Under the direction of the Project Superintendent they are responsible for assessing and communicating emergency response activities to MK-FIC. This includes accountability of Wyle and subcontractor personnel, and of visitors at the particular site under his charge, and equipment availability at the site. The EOD Leadman is responsible for maintaining an accurate and current accountability list of all personnel in the area and for monitoring the currency of the training of the personnel on his crew.

Upon activation of a take cover signal, the EOD Leadman will direct the evacuation of personnel from the affected area and into vehicles at the assembly area. In this regard he shall be responsible for maintaining the Emergency Accountability List for his assigned area and posting the list

and for checking all areas including storage facilities and restrooms to ensure that all personnel have been evacuated from the area. He will be the last to exit the area in an evacuation situation. Upon exiting, he will immediately take roll and complete the accountability list, and then stay with personnel at the assembly area to assist in vehicle boarding when the notification to start boarding is received.

3.3 TRAINING

All project personnel will be trained to the MK-FIC Emergency Action Procedure and the CFA/ INEL Emergency Plan; the Wyle supplement entitled 'Emergency Operations," and in the recognition of sirens, alarms, and other such warning devices, area evacuation routes, how and when to evacuate, and the importance of acting in a prompt and proper way to the emergency situation.

All project personnel will participate in area emergency drills as directed by MK-FIC. Records documenting the training of project personnel to the emergency action plan and associated supplement(s), and their participation in drills will be retained at the Wyle field office.

3.4 CENTER FOR EMERGENCY COINTROL

The Wyle Project Field Office will be established as an Center For Emergency Control (CEC) for emergencies that arise during this interim action. The Wyle CEC and key personnel, identified above, will be equipped with radios to ensure communication between the site of the emergency and the CEC. The CEC will be equipped with maps, the MK-FIC Emergency Action Plan, associated emergency response procedures, and emergency communication reporting procedures. The CEC will serve as the interface point with MK-FIC in coordinating response actions.

The Project Superintendent will report to the CEC and serve as the Wyle communication link with site emergency response teams. The telephone number for the Wyle CEC is *to be determined.* Mobile radios on the *to be determined* net will be located at each work area and in project vehicles.

3.5 ALARM RESPONSE

As identified in the MK-FIC Emergency Action Procedure, four types of alarms are possible that may occur at the INEL as a result of the operating activities of the facilities. These include the following: fire alarm, take-cover alarm, evacuation signal, and the criticality alarm. Wyle's personnel action response to these alarms is described in the subsequent sections.

Should an alarm be triggered during the ordnance detonation activities, detonation efforts will be secured if the leads are not yet onto the blasting mechanism. The leads will be shunted so that no stray electrical current will accidentally detonate the device. Detonation activities will resume once the area has been cleared from its alarmed response. The detonation site will remain off limits to unauthorized individuals by placement of the warning signs located prior to the start of detonation activity. If the leads are already secured to the blasting mechanism, the shot is ready and should proceed. Following the detonation, secure the site as described above.

3.5.1 Fire Alarms

A fire alarm may be announced over a voice paging system, by a water-activated gong, by an air horn, by telephone, or by any person stating a fire situation has developed. The individual discovering a fire shall immediately activate the nearest manual fire alarm box if one is located in the area, and telephone the INEL Fire Department at 777 or radio the Warning Communication Center (KID 240) and report the location of the fire, number of injured personnel and any additional information that might assist the Fire Department.

When a fire is announced or an alarm sounded in a work area, personnel with fire extinguisher training experience will begin the effort to extinguish the fire using fire extinguishers present in the area. Untrained personnel will leave the vicinity of the site using the shortest possible route and move upwind of the affected area and retreat to a safe distance as determined by the Project Superintendent or his designee, from the involved area until the situation is remedied and risks have been eliminated. Personnel shall not re-enter the area until approval from the INEL Fire Department has been given.

3.5.2 Take–Cover Alarm

The take-cover alarm is a steady-tone siren. It is sounded when personnel are best protected from a hazardous condition by seeking shelter inside buildings. An announcement over the

voice paging system will be made immediately after the take-cover signal, stating the location of the emergency and providing necessary information and instructions. An "all clear" message will be announced when the problem is resolved.

All personnel shall immediately seek shelter in the nearest building and/or vehicle not involved in the emergency. Personnel shall remain inside the building and/or vehicle until directed otherwise. All doors and windows shall be shut. Personnel shall not eat, drink, chew, or smoke. All ventilation equipment, including fans and forced air heaters in non-process related buildings, shall be turned off.

3.5.3 Evacuation Signal

An evacuation signal is an alternating-tone generated siren (five to 10 seconds on, five to ten seconds off). The Operating Contractor sounds the evacuation alarm when evacuation is necessary. The evacuation alarm will sound automatically when a criticality alarm occurs. The Project Superintendent will be in radio contact with the Warning Communications Center. Personnel (except emergency response personnel) shall proceed immediately to designated staging areas.

When personnel hear an order to evacuate, they will immediately park vehicles and walk to designated assembly areas for accountability. Personal vehicles will not be allowed to leave the INEL during an evacuation.

3.5.4 Criticality Alarm

A criticality alarm may occur at certain INEL facilities and Wyle project personnel shall respond to the associated Operating Contractor Emergency Action Plan. Criticalities are addressed in the Operating Contractors' Emergency Action Plan.

3.6 EMERGENCY CONTACTS

A roster identifying location and telephone numbers of emergency personnel, facilities, and off-site personnel will be posted at the project field office and command post(s) as shown in Figure 3–2.

EMERGENCY CONTACTS

Ambulance	777 or 526–2356
First Aid (Bldg. CF 603)	526-6263
Fire – CFA	777 or 526–2212
Fire – Argonne	777 or 533–7233
Warning Communications Center (WCC)	526-1515
Security	777
MK-FIC Remedial Action Engineer Rich Medellin	526-4072
Area Emergency Action Director	526-2226
Occupational Medical Program	523-9552
MK–FIC Health and Safety Officer Hance Clayton	526-8197
MK–FIC/ER Environmental Health & Safety Program Manager Roger Jones	526–8590
Project Safety Officer David Johnson	526–3072
MK-FIC Industrial Hygene T. R. Collings	526-8581
Industrial Hygiene B. L. Lippy	523-9552
Radiological Control (through MK-FIC) EG&G	TBD
Area Landlord (EG&G) Ronald L. Dixon	TBD
Project Superintendent J. Santa Cruz/David Lindsey	526–3072

This roster will be updated prior to initiation of RA with all current phone numbers, pagers, and personnel identification. This will be posted at the project field office and command post(s). This emergency reference list will be included in the field sampling logbook.

Figure 3-2. Emergency Reference List

3.7 EMERGENCY PROCEDURES

3.7.1 Modified Emergency Procedures

In response to an emergency, the Project Superintendent will immediately notify the MK-FIC Remedial Action Engineer or his on-site designee. He will, in turn, notify the Warning Communication Center (WCC) by telephone by dialing 526-1515 or radio (KID 240). The WCC will then notify the appropriate response organization to assist with the emergency response.

Two scenarios may occur while conducting the blasting operations associated with this remedial action. They include a premature detonation or unplanned explosion and a misfire. Specific procedures are in place to prevent and minimize the possibility of a premature detonation or unplanned explosion (see SOP 518-200-011B). However, if such an event occurs, the personnel will immediately evacuate the area. The Project Superintendent will then assess the situation, and will determine how to proceed with the investigation, and will direct personnel accordingly to support the efforts.

A misfire as described in SOP 518-200-011B and the DOE Explosive Safety Manual requires a 60-minute wait prior to investigation. The SOP describes in detail the response procedures to be followed.

Hand-held F-net radios as well as an air horn to communicate emergency situations, will be available at the work site at all times. A transportation vehicle will be positioned in proximity to the evacuation route. The buddy system will be reviewed and followed.

Hand signals will be used if an emergency situation arises and normal communication becomes impossible or unsafe. The following hand signals will be used in an emergency:

- Hand gripping throat – signals that the person is out of air or can't breath
- Grip partner's waist or both hands around waist – means leave area immediately
- Hands on top of head – signals that assistance is needed
- Thumbs up – okay, I'm all right, I understand
- Thumbs down – no, negative

3.7.2 Requirements for Task Site Evacuation

Operations may be suspended for several reasons such as those indicated below. The reasons for operations shutdown are directly related to the degree of hazard found in each task. Examples include excessive vapor/gas concentrations, radiological hazards, unsuspected hazards, inclement weather, fire or an unplanned explosion.

- Work shall stop if radiological contamination is identified at the work area.

- Work shall stop when electrical storms approach within 5 miles, in accordance with Standard Operational Safety Requirements, Appendix 0550, Subpart III–I, Explosives.

- In addition, detontations, drilling, sampling, calibration, instrumentation, and other weather sensitive activities will stop during consistent high winds (i.e., >25 mph), or other inclement weather.

- In the event of a range fire, EOD personnel shall immediately evacuate the area and notify the EG&G Idaho Fire Department. EOD personnel shall not attempt to fight range fires.

- EG&G Idaho Fire Department has been directed that before fighting a range fire in any of the work areas or the detonation range, the EG&G Idaho Fire Department shall consult with Wyle EOD personnel to determine if UXO is present or suspected to be present. The Fire Department shall not fight the fire if UXO is or may be present. Wyle EOD personnel shall be available for consultation by the fire department as needed.

If evacuation from the site is required, the evacuation route will be upwind to the appropriate staging area. The Project Superintendent and Project Safey Officer will evaluate conditions daily and modify the routes as appropriate. Evacuation route changes will be communicated to the work area personnel at the morning tailgate meeting.

3.7.3 Accident/Incident Investigation and Reporting

All accidents or incidents will be investigated and an accident report completed. MK–FIC will be notified by telephone as soon as first aid and/or emergency response needs have been met. A written report will be provided within 24 hours.

For reporting purposes, the term accident refers to fatalities, lost time injuries, spill or exposure to hazardous materials (radioactive materials, toxic materials, explosive or flammable materials), fire, explosion, or property damage.

3.7.4 Procedures for Inclement Weather

In accordance with the DOE Explosives Safety Manual, in the event of inclement weather (rain, snow, winds exceeding 25 mph, or thunderstorms within 5 miles), which in the opinion of the Project Superintendent poses a risk to the safety of the crew, operations will cease until the Project Superintendent determines it is safe to proceed.

3.7.5 Equipment Failure or Hazardous Material Spill

If site equipment fails to operate properly, the Project Superintendent will be notified and the effect of the failure on continuing operations determined. If the failure affects the safety of personnel, they shall evacuate the site until the situation is evaluated and appropriate actions are taken.

If a hazardous material spill has ensued, the MK-FIC RAE will be notified and work shall cease until spill remediation activities are completed and MK-FIC authorizes resumption of work. In the event the RAE determines that an RQ (Reportable Quantity) spill has occured, he will notify the MK-FIC Emergency Action Manager (EAM). All actions of Wyle personnel will follow Wyle SOP 518-7-97, "Emergency Spill Response Procedures."

3.8 EMERGENCY EQUIPMENT

The following emergency equipment shall be located at the work site during field operations. Additional equipment deemed necessary at a particular site shall be provided as prescribed in the Site Specific ES&H Plan.

Fire Extinguisher – No.: 9

Location(s): Command Post A (1)
Command Post B (1)
Blast Area (1)
Explosives/UXO Transport Vehicle (2)
Magazine (2)
Field Office (2)

Maintenance Schedule: Monthly, and after use

First Aid Supplies – No.: 4

Location(s): Command Post A (1)
Command Post B (1)
Blast Area (1)
Field Office (1)

Maintenance Schedule: Monthly, and upon use

Portable Eyewashes – No.: 3

Location(s): Command Post A (1)
Commnd Post B (1)
Blast Area (1)

Maintenance Schedule: Monthly, and upon use

3.8.1 Fire Extinguishers

Because of the potential threat of fire at the work area, at least one 20-pound (minimum) ABC fire extinguisher will be readily available at each command post. Fire extinguishers will also be included in the following: explosives/UXO transport vehicle, command post, and magazine.

3.8.2 First Aid Kits

An industrial first aid kit with supplies for five people shall be kept in the support zone at each location All individuals of the on-site project team shall be trained and certified in first aid and CPR. The OMP physician will advise on the selection of first aid supplies to be included at each task site. The Project Safety Officer will be responsible for maintaining the proper

level of first aid supplies in the task site first aid kit.

3.8.3 Eye Wash

Portable eyewash fountains and a supply of potable water sufficient to flush for at least twenty minutes will be readily available for the duration of the task at each active work area. The location of the eyewash will be specified by the Safety Officer.

3.9 DEFINITIONS

Following is a list of definitions that reflect the requirements and methodologies in effect in the Site Emergency Plan:

Alert. An event that actually or potentially involves a substantial reduction in the level of safety of the facility. An alert is the least severe of the three classes of emergencies defined by the DOE.

Wyle understands that limited off-site releases of radioactive or toxic materials may occur from INEL facilities. For toxic materials, off-site releases are not expected to exceed applicable permissible limits. The purpose of the Alert is to ensure that on-site and off-site emergency response personnel are promptly advised and available to be activated in the event the situation becomes more serious; to initiate and perform confirmatory monitoring if required; and, to ensure appropriate notification of emergency conditions to the responsible organizations at the INEL. The ECC shall be activated.

Site Emergency. An event that actually or likely involves major failures of facility functions needed for the health and safety of on-site personnel, the public, and the environment. A site emergency is the second most severe of the three classes of emergencies defined by the DOE.

Off-site releases of radioactive material from INEL facilities are not expected to exceed Protective Response Recommendation guides. For toxic materials, off-site releases have the potential to exceed applicable limits. The purpose of the Site Emergency is to assure that ECCs are manned, that appropriate monitoring teams are dispatched, that personnel required for

determining on-site protective measures man their duty stations, that predetermined protective measures for on-site personnel are initiated, and that current information is provided to DOE-ID.

General Emergency. An event that involves, actual or imminent, substantial reduction of facility safety systems. A General Emergency is the most severe of the three classes of emergencies defined by the DOE.

Off-site releases of radioactive materials from INEL facilities are occurring or are expected to occur in excess of Protective Response Recommendations. Off-site releases of toxic materials have exceeded or are expected to exceed applicable permissible limits. The purpose of the General Emergency is to initiate pre-established health and safety measures for on-site personnel, the public, and the environment; to provide continuous assessment of emergency conditions; and exchange information between on-site and off-site personnel. Declaration of a General Emergency will initiate major activation of DOE-wide resources.

Confined Spaces. A confined space is an enclosure that exhibits the following:

- Limited means for entry and exit, by reason of location , size, or number of openings
- Unfavorable natural ventilation which could contain or produce dangerous air contaminants, flammable or explosive atmospheres, and/or oxygen deficiency
- Its primary function is for other than human occupancy

Confined spaces include such things as storage tanks, compartments of ships, process vessels, pits, silos, vats, degreasers, reaction vessels, boilers, ventilation and exhaust ducts, sewers, tunnels, underground utility vaults, bins, tubs, tank trucks, pipelines, and excavations greater than four feet in depth.

Before employees are permitted to enter a confined space, the hazards shall be identified and evaluated. Individuals in charge of confined space entry shall ensure that an Emergency Response Team and rescue equipment are immediately available and in operable condition.

Uncontrolled Fire. Uncontrolled fire represents one of the most severe threats to on-site personnel, equipment, and facilities. In most instances, fire detection equipment will automatically notify the INEL Fire Department and the Warning Communication Center.

Explosion: An explosion is a sudden release of energy from a confined space. The released energy may have originated from an accidentally triggered high explosive device, e.g., an unexploded ordnance, an exothermic chemical reaction or from stored compressed air, steam, or high pressure liquid. Damage may be caused by the shock wave or from flying debris. An explosion is a operational emergency.

Credible Emergencies. Credible emergencies are divided into four types: operations, radiological, natural, and safeguards and security. The severity of the emergency will increase when simultaneous event types occur. Operational emergencies only have been addressed in this procedure. Radiological, natural, and safeguards and security emergencies are addressed in the Operating Contractors' Emergency Action Programs. Wyle will respond to these emergencies as directed by MK-FIC.

Section 4
ARAR COMPLIANCE

The substantive requirements of IDAPA 16.01.01650 Rules for Control of Fugitive Dust and General Rules are applicable. The removal action will comply with the requirements by using good management practices to control fugitive dust.

The substantive requirements of 40 CFR Subpart P, Section 265.382, Open Burning: Waste Explosives are considered relevant and appropriate for this removal action. This requires operators to maintain a minimum safe distance when detonating UXO so as to protect human health or the environment. The distances listed in this requirement are not as stringent as the requirements specified in the Department of Defense Joint Services Technical Manual (TM)-60 Series. The TM-60 Series documents will be utilized to govern the safe handling and demolition of UXO, including the greater safe distances. The Department of Defense Joint Service Technical Manual (TM-60) Series will be utilized for the safe handling and demolition of ordnance to protect human safety and the environment.

Idaho air toxic regulations, IDAPA 16.01.01585 which lists Toxic Air Pollutant Non-Carcinogenic Increments, will be effective May 1, 1994. These regulations establish Emission Screening Levels and Acceptable Ambient Increments for non-carcinogenic air pollutants and are considered applicable.

The removal action may have emissions of the following compounds:

- cyclonite
- 1,3 dinitrobenzene

Cyclonite and 1,3 dinitrobenzene are present on the non-carcinogenic list and have the limits shown below.

Compound	Emission Screening Limit (lb/hr)	Ambient Increment (mg/m^3)
Cyclonite	0.1	0.015
1,3 dinitrobenzene	0.067	0.01

Emissions from the removal action must be calculated, then compared to the Emission Screening Limits. As per IDAPA 16.01.01210.12, emissions from a short-term source (less than 5 years duration) may be multiplied by 0.10 to demonstrate compliance. If the Emission Screening Limit is exceeded, the emission must be modeled to determine compliance with the Ambient Increment.

It has been conservatively estimated, based on knowledge of explosives, military technical manuals on ordnance and the associated compounds (NAVSEA OP 1664, Volumes 1 and 2, US Explosive Ordnance), and experience and air modeling during the OU 10-05 Interim Remedial Action, that less than 10 pounds of cyclonite and 1,3 dinitrobenzene are present in the total quantity of material to be treated during this removal action. If it is further assumed that none of this material is destroyed during detonations, the total project emissions are 10 pounds of cyclonite and 10 pounds of 1,3 dinitrobenzene. The annual average hourly emission rates for these compounds are 0.0011 lbs/hr (10/(365X24)). this emission rate, even without using the 0.1 factor for short-term sources, is well below the Emission Screening Limit, so no additional analyses are required to demonstrate compliance with air toxics regulations.

IDAPA 16.01.01581 Prevention of Significant Deterioration Increments is considered relevent and appropriate to this removal action. Air modeling to estimate total suspended particulate (TSP) emissions from detonations conducted during the OU 10–05 Interim Remedial Action was sufficient to demonstrate that the potential detonations under the OU 10–03 action would not have a significant impact on TSP increments.

Section 5
SCHEDULE

The schedule for the Ordnance Removal Action activity on this program is shown in Figure 5–1. Selected functions have been combined to simplify the presentation. The ordnance removal activity includes all of the UXO search, detonate, and blast area functions.

As shown in the schedule the field work will begin when the Industrial Hygienist has had the opportunity to establish the level of Personal Protective Equipment that will have to be worn by operations personnel. The level of PPE established, the field operations will begin approximately 10 June with both Teams 1 and 2 working in the Twin Buttes Bombing Range area.

The basic field work will continue through the 25th of September when the final disposal task will have been completed. At the 80–percent point in the Twin Buttes Bombing Range and the Naval Ordnance Disposal areas ordnance removal activity, DOE/EPA/IDHW pre–final inspection will be performed. Wyle will demobilize from the INEL by 30 September.

With the completion of the Pre–Final Inspection the work of preparing the last two elements of the project documentation will be undertaken. Shown in Figure 5–2 is the schedule for the preparation of the documents that are to be submitted to complete the program. The Pre–Final Inspection Report comments will be finalized on 9 September. Approval of the Remedial Action Report is expected on 30 September 1994.

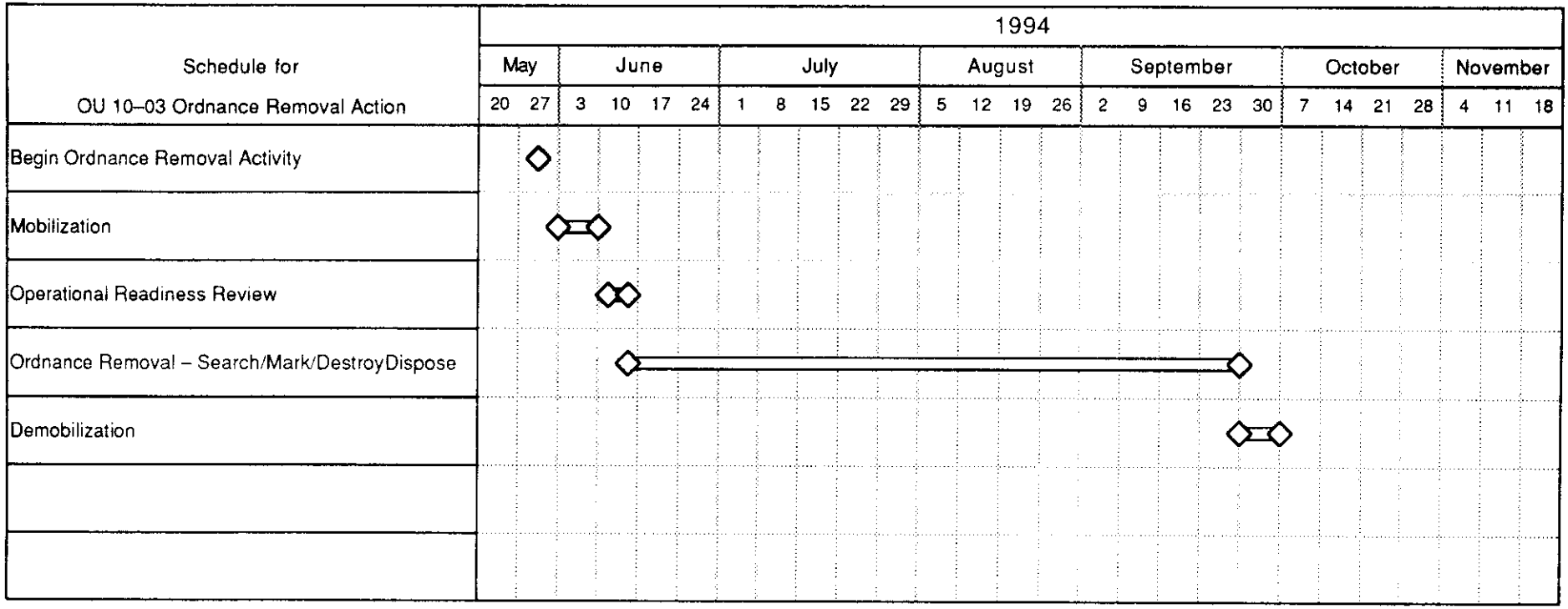


Figure 5–1. Ordnance Removal Action Schedule

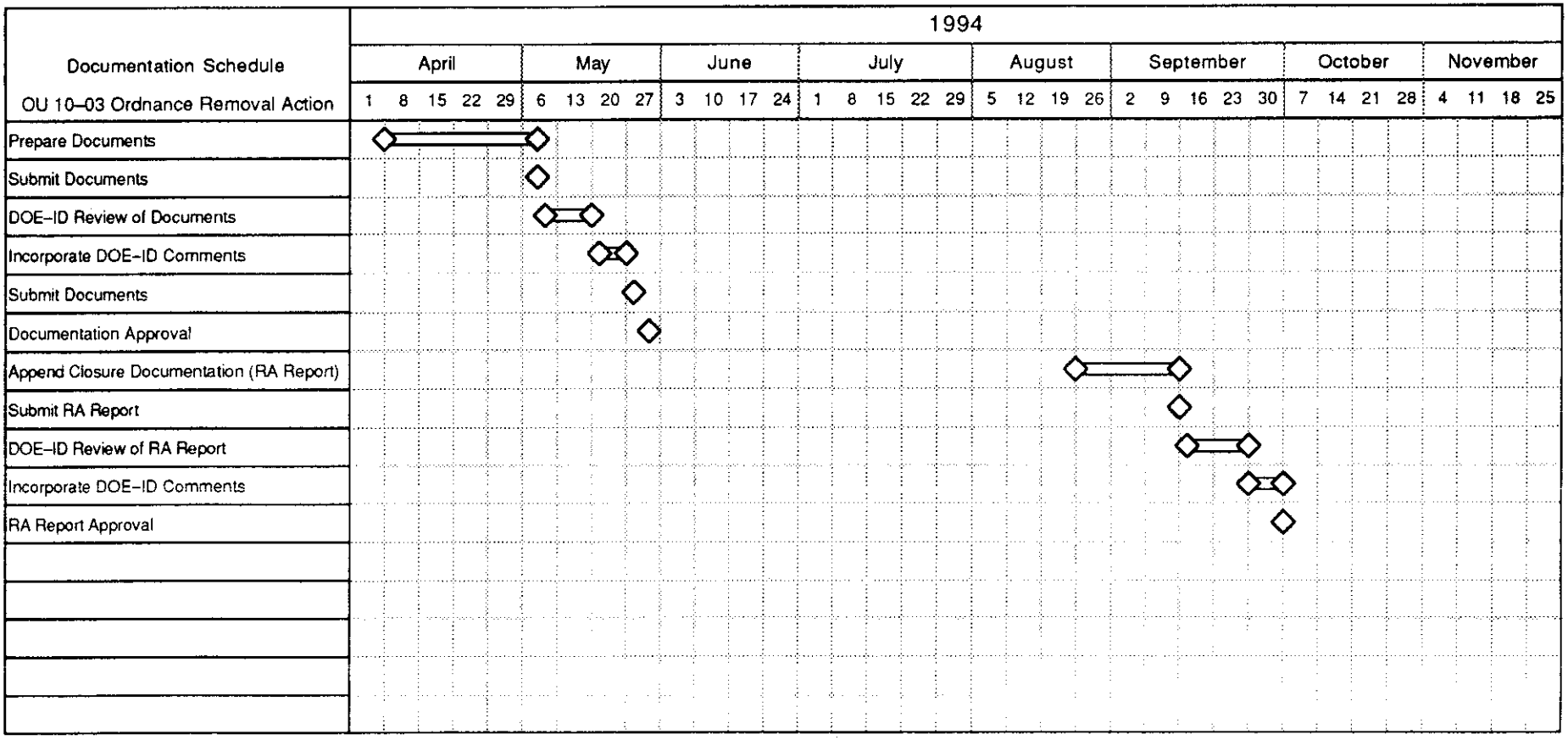


Figure 5–2. Documentation Schedule

Section 6
ESTIMATED COSTS OF REMOVAL ACTION

Provided in this section of the document is an estimate of the costs of the removal action activity. Shown in Figure 6–1 is the expenditure versus time relationship. These estimates include $40,414 which is the plannning documentation element of the program.

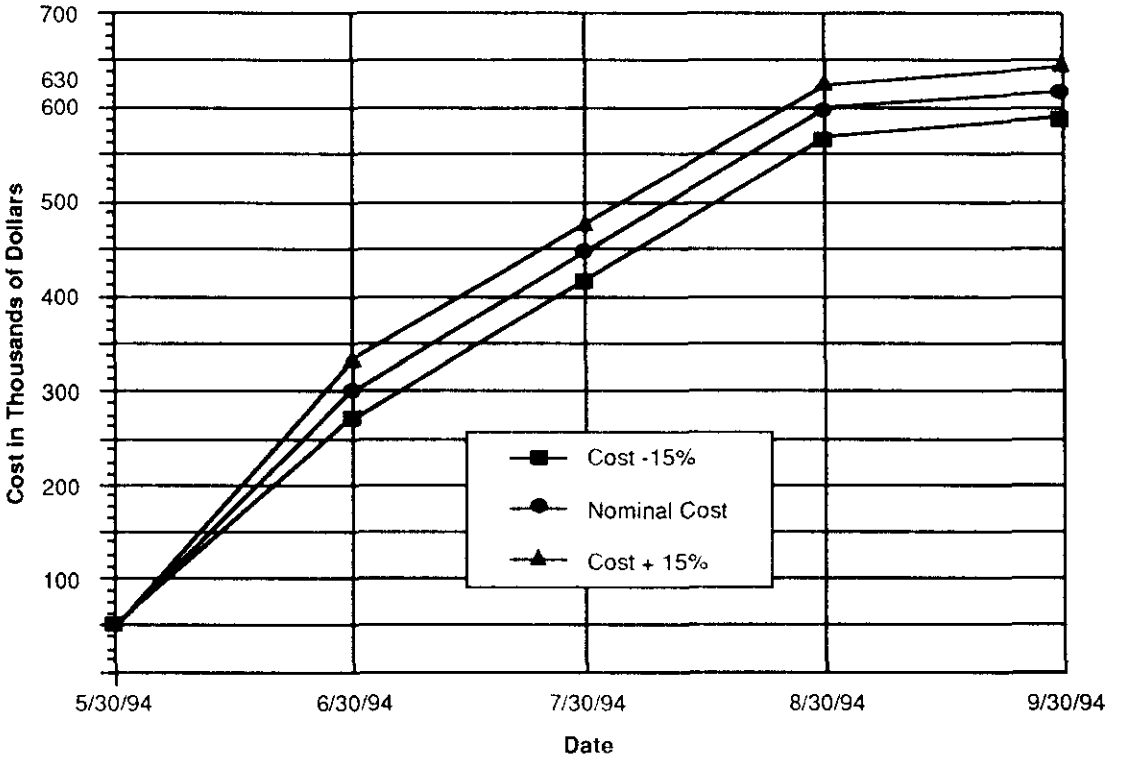


Figure 6–1. RA Expenditures vs. Time

The data are provided in Table 6–1. The quantities on which the pricing is based have not been precisely established. Estimates have the actual quantities in the range ± 15%. Hence the actual cost is not precisely determinable. Upper and lower limits are provided in the table as well as the nominal fixed price cost.

Table 6–1
Estimates of RA Costs

LINE ITEM #	TITLE	QUANTITY			COST		
		−15%	Nominal	+15%	−15%	Nominal	+15%
A.1	Visual Search (acres)	111	130	150	92378	108680	124982
A.2	Geophysical Search (acres)	111	130	150	113263	133250	153237
A.3	Ordnance Marking and Logging (each)	85	100	115	595	700	805
A.4	Contamination Area Markign (ft^2)	1275	1500	1725	68276	80325	92374
A.5	Caution Sign Posting (each)	221	260	299	12818	15080	17342
B.1	Investigatory Detonations (lbs)	85	100	115	8500	10000	11500
B.2	Destructive Detonations (lbs)	17000	20000	23000	10200	12000	13800
C.1	TNT (lbs)	170	200	230	3230	3800	4370
C.2	RDX (lbs)	85	100	115	2975	3500	4025
D.2	Metal Debris (lbs)	8500	10000	11500	3570	4200	4830
E.	16" Shells (each)	3	4	5	8840	10400	11960
F.	Final RA Report	1	1	1	23616	23616	23616
G.1	Mobilization	1	1	1	137000	137000	137000
G.2	Demobilization	1	1	1	38000	38000	38000
	TOTALS				523261	580551	637841

WYLE LABORATORIES

Section 7
INSPECTIONS AND REPORTS

Once the ordnance removal action has been initiated and all facets of the operation have begun, the FFA/CO Project Managers, DOE, EPA, and IDHW or their designees, may inspect the staged activities to assess compliance with the Remedial Design and the procedures outlined in this Remedial Action Work Plan. No report will be generated as a result of these field oversight inspections; however, revisions to the procedures may be necessary to fine–tune the procedures to represent the actual events in the field.

7.1 REMOVAL ACTION REPORT

The Removal Action Report will be prepared at the completion of the action treatment. The report will be submitted to EPA and IDHW.

The report will include the following:

- A synopsis of the work defined in the RA Work Plan and certification that this work was performed
- An explanation of any modifications to the RA Work Plan
- Full documentation of any ordnance located but not detonated or removed under this interim action
- Documentation of the lessons learned on this interim action that can be utilized on future ordnance removal actions
- Documentation of the final inspection

The approval of the report will close out the program.

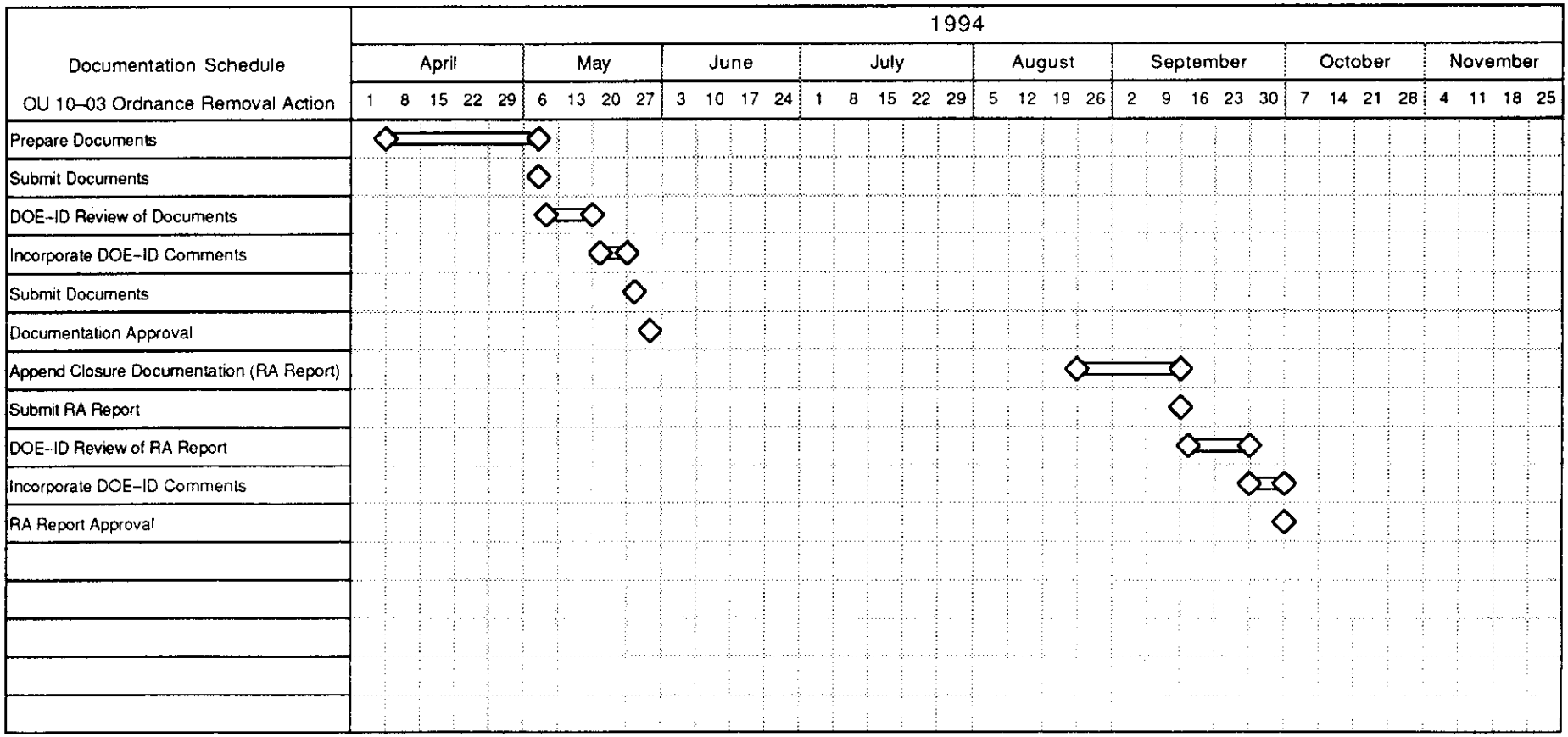
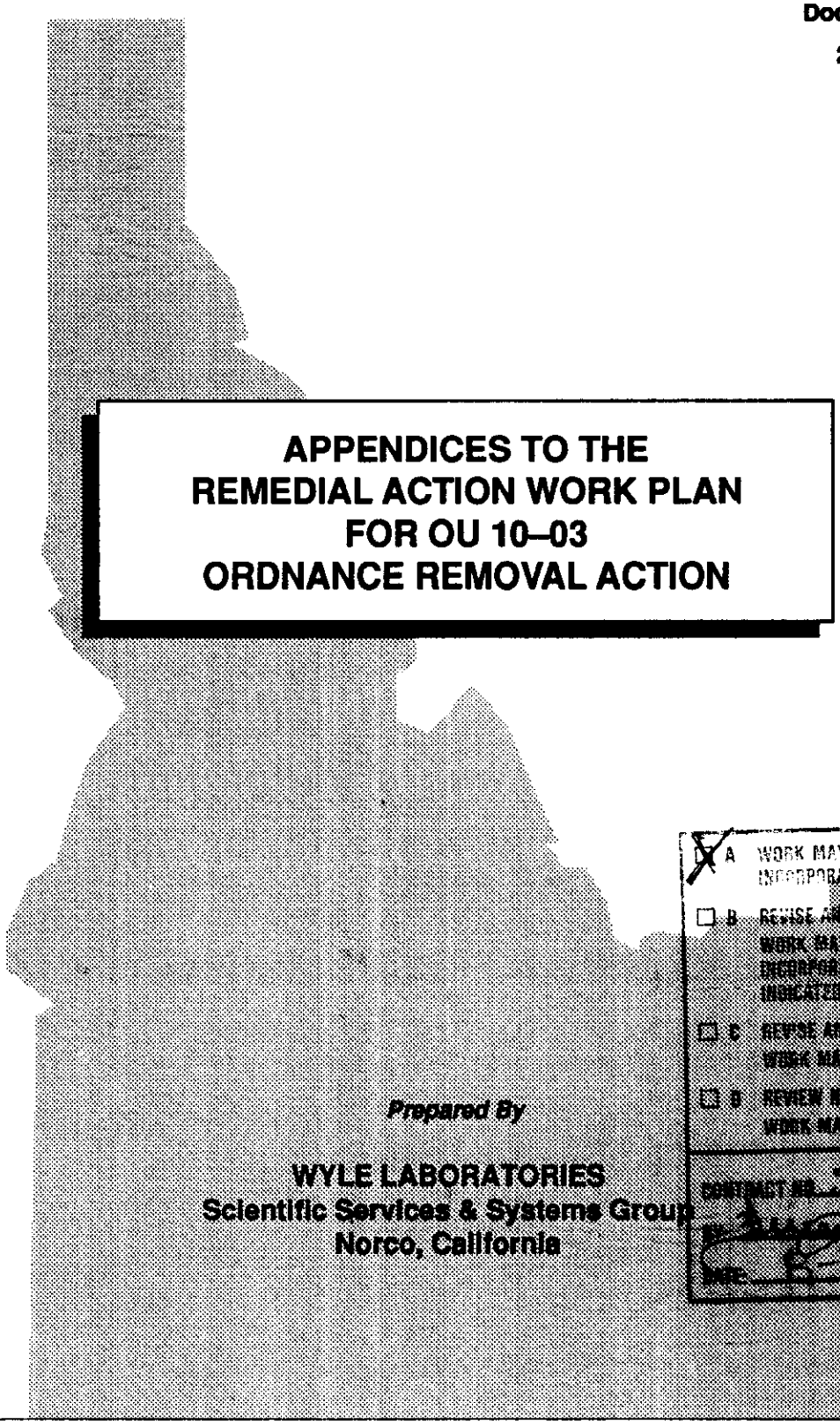


Figure 5–2. Documentation Schedule

Document Number
23-ICP-05-1
Revision 2

APPENDICES TO THE REMEDIAL ACTION WORK PLAN FOR OU 10-03 ORDNANCE REMOVAL ACTION



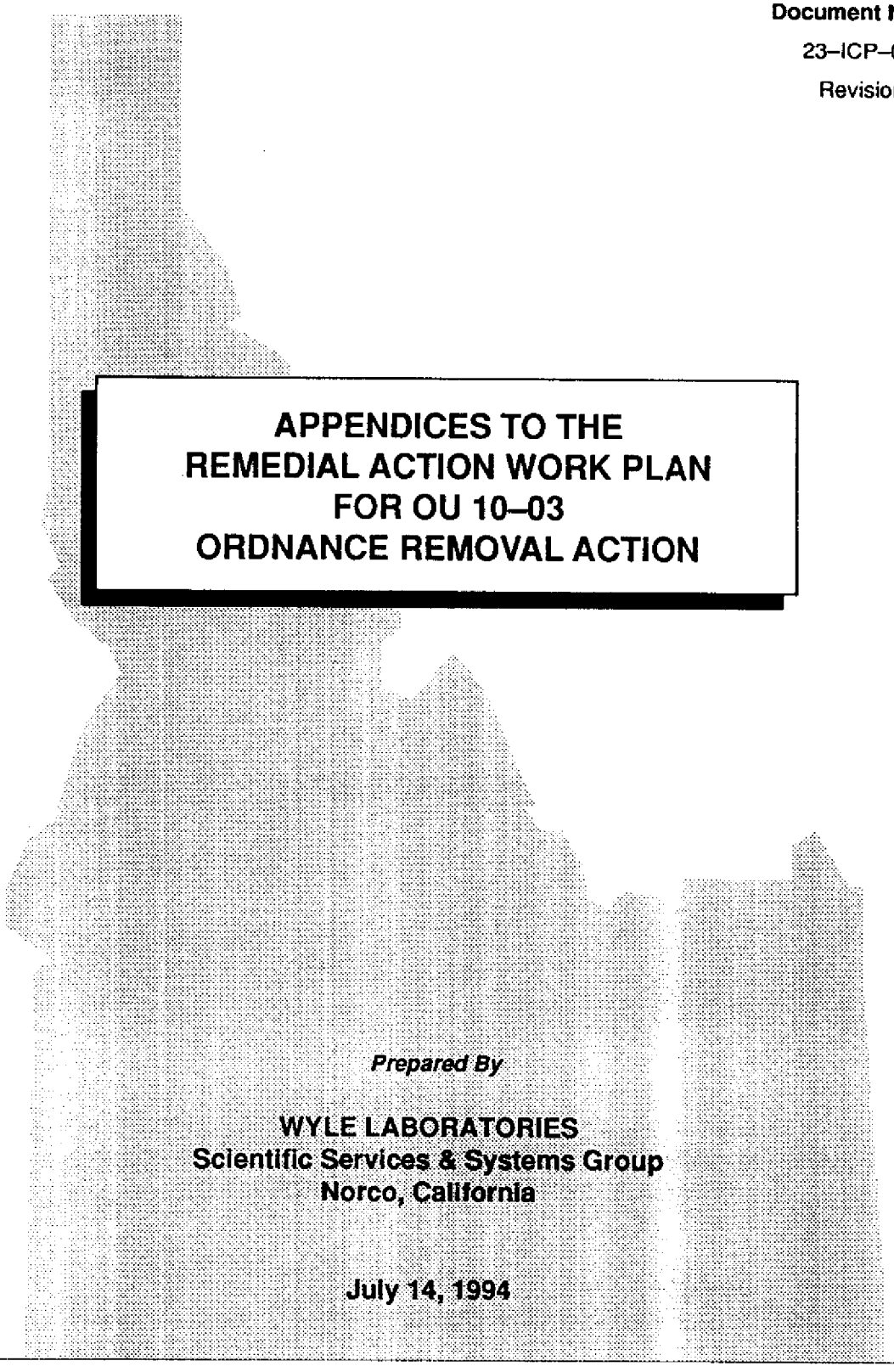
Prepared By

WYLE LABORATORIES
Scientific Services & Systems Group
Norco, California

WYLE LABORATORIES

Prepared under MK-FIC Contract No. S-500992, Ordnance Removal Action at the Idaho National Engineering Laboratory.

Document Number
23–ICP–05–1
Revision 2



APPENDICES TO THE REMEDIAL ACTION WORK PLAN FOR OU 10–03 ORDNANCE REMOVAL ACTION

Prepared By

WYLE LABORATORIES
Scientific Services & Systems Group
Norco, California

July 14, 1994

WYLE LABORATORIES

Prepared under MK–FIC Contract No. S–500992, Ordnance Removal Action at the Idaho National Engineering Laboratory.

Appendix A
Hazardous Material Data

HAZARDOUS MATERIAL SAFETY DATA SHEETS

Presented in the pages that follow are Material Safety Data Sheets for the compounds that may be used or encountered by Wyle Laboratories in the ordnance removal activity.

1. Cyclotrimethylene–trinitramine (RDX) – Tradename: Composition 4 (C4)
2. Ethylene Glycol
3. Gasoline
4. Isopropo Alcohol
5. Methyl Alcohol
6. Petroleum Oil
7. Pentaerythrite Tetranitrate – Tradename: Primacord Detonating Cord
8. Tetryl
9. 2,4,6 Trinitrotoluene

Any chemical brought onto the INEL must have a pre–submitted by Material Safety Data Sheet and hazardous material list reviewed and approved by MK–FIC ERP.

If any compounds other than the above are encountered, the compound will be analyzed and the appropriate Material Safety Data Sheets will be provided.

CYCLOTRIMETHYLENE-TRINITRAMINE

MATERIAL SAFETY DATA SHEET

Safechem No.: 268
Serial No.:

CYCLOTRIMETHYLENE-TRINITRAMINE

EMERGENCY TELEPHONES:
CHEMTREC: 800-424-9300
MANUFACTURER: Vendor phone # not noted
COMPANY RESP.: Emergency phone not noted
MSDS PREPARATION DATE:

FIRE HAZARDS		scale
HEALTH	2	0=not ent
FLAMMABILITY	3	*1=slight
REACTIVITY	4	*2=moder.
		*3=high
*) NFPA		*4=extreme
		5=unknown
		6=no impact

SECTION I: IDENTITY

SYNONYMS & TRADE NAMES [Family]: #)Trade names
CYCLONITE, HEXOGEN, HMX, RDX, TRIMETHYLENETRINITRAMINE, HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE

FORMULA: C3-H6-N6-O6
HAZARD CLASS: Class A Explosives

MANUF. NAME : Vendor name not noted
ADDRESS : Vendor address not noted
Vendor city, state, zip not noted
UN CLASS :

MOL. WEIGHT: 222.26
EPA #: N/E
CAS #: 121-82-4
NIOSH #: XY9450000
DOT/UN/NA #: 72
PART #: N/E

SECTION II: HAZARDOUS INGREDIENTS

This is a single-component chemical

SECTION III: PHYSICAL & CHEMICAL CHARACTERISTICS

BOILING POINT (760mmHg):	N/E	SPEC.GRAVITY(@ 68F):	1.82
VAPOR PRESSURE(mmHg) :	N/E	MELTING POINT (F):	396
VAPOR DENSITY (air=1):	N/E	EVAPORATION RATE(BuAc=1):	N/E
PERCENT VOLATILE BY VOLUME:	N/E	VISCOSITY:	N/E
		pH-VALUE:	N/E
SOLUB.VALUE(g/100gH2O,68F):	N/E	CONCENTRATION (%/MOL):	N/E

SOLUBILITY: insoluble in water, slightly soluble in methanol, ether, acetic acid, soluble in acetone
APPEARANCE: solid, crystals or crystalline, powder,dust
COLOR : white
ODOR : N/E

SECTION IV: FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (F): N/E
FP METHOD : N/E
AUTO IGNITION TEMP.(F): N/E
FLAMMABLE LIMITS: -lower %:
-upper %:

NFPA FLAMMABILITY RATING: Ignites easily (3)
OSHA FLAMMABILITY CLASS : N/E

FIRE AND EXPLOSION HAZARD DATA (continued ...)

EXTINGUISHING MEDIA: No specific method or medium noted.
SPECIAL FIRE FIGHTING PROCEDURES
No specific fire fighting procedures noted.
EVACUATION PROCEDURES
No specific evacuation procedures noted.
NIOSH RESPIRATOR RECOMMENDATION
No specific recommendation made, but respiratory protection may still be required under exceptional circumstances when excessive air contamination exists.
UNUSUAL FIRE & EXPLOSION HAZARDS
May explode in a fire. May develop highly toxic or corrosive fumes if heated.

SECTION V: REACTIVITY DATA & PHYSICAL HAZARDS

STABILITY:	Unknown
CONDITIONS TO AVOID:	Avoid heat, sparks, flames, shocks and physical damage
REACTIVITY INDEX:	Explosive (4)
HAZARDOUS DECOMPOSITION OR BYPRODUCTS:	Toxic gases/vapors/fumes of oxides of nitrogen
HAZARDOUS POLYMERIZATION:	N/E
CONDITIONS TO AVOID:	N/E
WATER REACTIVE?:	No
AIR REACTIVE? :	No

INCOMPATIBLE SPECIFIC CHEMICALS:

INCOMPATIBLE CLASSES OF CHEMICALS: Unspecified
INCOMPATIBLE CONDITIONS:

SECTION VI: HEALTH HAZARD INFORMATION

ROUTES OF ENTRY: inhalation, ingestion, skin and/or eye contact
TARGET ORGANS : central nervous system, eyes, respiratory system, lungs, skin
TOXIC DOSE (LD 50): 200mg/kg (oral rat)
TOXICITY INDEX : Highly toxic (4)
PERMISSIBLE EXPOSURE LIMITS:

FED-OSHA PEL:	1.5mg/m3(s)
ACGIH TWA:	1.5mg/m3(s)
ACGIH STEL:	No std.
NIOSH PEL:	No std.
NIOSH IDLH:	No std.
CAL-OSHA PEL:	1.5mg/m3(s)

CARCINOGENICITY:
NTP? NO
IARC? YES
OSHA? NO

TOXICOLOGICAL INFORMATION: None entered

HEALTH HAZARD INFORMATION (continued ...)

HEALTH WARNINGS
Convulsant.
ACUTE & CHRONIC HEALTH HAZARDS
SIGNS AND SYMPTOMS OF EXPOSURE
convulsions, shock, cramps, muscle twitching
MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
No notation of medical conditions generally aggravated by exposure
EMERGENCY AND FIRST AID PROCEDURES
EYE CONTACT: Promptly wash eyes with lots of water while lifting the eye lids. Get medical attention if any discomfort continues.
SKIN CONTACT: Remove victim from source of contamination. Promptly wash contaminated skin w/soap or mild detergent and water. Promptly remove clothing if soaked through and wash as above. Get medical attention promptly if symptoms occur after washing.
INHALATION: Move the exposed person to fresh air at once. Perform artificial respiration if breathing has stopped. Keep the affected person warm and at rest. Get prompt medical attention.
INGESTION: NEVER MAKE AN UNCONSCIOUS PERSON VOMIT OR DRINK FLUIDS! Get medical attention.

SECTION VII: PRECAUTIONS FOR SAFE HANDLING AND USE
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Cover with weak reducing agent (hypo, bisulfites). Transfer to container of water and neutralize with soda ash. Keep combustibles away from spilled material. Clean-up personnel should use respiratory and/or liquid contact protection.
WASTE DISPOSAL
Incinerate in suitable combustion chamber. Neutralize with soda ash/slaked lime and discharge to sewer with lots of water. Refer to Croner's "Dangerous Chemicals Emergency Spillage Guide". Dilute w/water, neutralize w/H2SO4, flush to sewer with lots of water.
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Flammable/combustible: Keep away from oxidizers, heat and flames. Isolate from other materials. Protect against physical damage and/or friction.
Explosive storage
OTHER PRECAUTIONS
Keep away from heat, sparks and open flame. Avoid spilling, skin and eye contact. Read and follow manufacturer's recommendations. Wear full protective clothing for prolonged exposure and/or high conc.

SECTION VIII: PROTECTION AND CONTROL MEASURES
RESPIRATORY PROTECTION (required above 1.5mg/m3(s))
No specific recommendation made, but respiratory protection may still be required under exceptional circumstances when excessive air contamination exists.

PROTECTION AND CONTROL MEASURES (continued ...)

PROTECTIVE GLOVES: No specific hand protection noted. For prolonged or repeated skin contact use suitable protective gloves.
EYE PROTECTION: Wear chemical safety goggles where eye exposure is reasonably probable.
OTHER PROTECTIVE CLOTHING OR EQUIPMENT: No specific protective equipment noted, but may be required anyway.
HYGIENIC WORK PRACTICES: No specific hygiene procedures noted, but good personal hygiene practices are always advisable, especially when working with chemicals.
VENTILATION REQUIREMENTS: No specific ventilation requirements noted, but forced ventilation may still be required if air contamination exceeds acceptable level.

SECTION IX: ADDITIONAL INFORMATION
ENVIRONMENTAL LISTINGS
IARC-Int. Agency for Research Cancer

Listed data compared to manufacturer's MSDS? NO
NOTE: Use with caution! Data may not reflect manufacturer's recommendations.
Verified and approved for use by: No name noted on
Revised by: No name noted on

End of MSDS

ETHYLENE GLYCOL

MATERIAL SAFETY DATA SHEET

Safechem No.: 402
Serial No.:

ETHYLENE GLYCOL

EMERGENCY TELEPHONES:
CHEMTREC: 800-424-9300
MANUFACTURER: Vendor phone # not noted
COMPANY RESP.: Emergency phone not noted
MSDS PREPARATION DATE:

FIRE HAZARDS		scale
HEALTH	1	0=not ent
FLAMMABILITY	1	*1=slight
REACTIVITY	1	*2=moder.
		*3=high
*) NFPA		*4=extreme
		5=unknown
		6=no impact

SECTION I: IDENTITY

SYNONYMS & TRADE NAMES [Family]: #)Trade names
1,2-ETHANEDIOL, EG, ETHYLENE ALCOHOL, GLYCOL, GLYCOL ALCOHOL, [Aliphatic glycol]

FORMULA: C2-H6-O2
HAZARD CLASS: Poison B

MOL. WEIGHT: 62.07
EPA #: N/E
CAS #: 107-21-1
NIOSH #: KW2975000
DOT/UN/NA #: 2810
PART #: N/E

MANUF. NAME : Vendor name not noted
ADDRESS : Vendor address not noted
Vendor city, state, zip not noted
UN CLASS :

SECTION II: HAZARDOUS INGREDIENTS

This is a single-component chemical

SECTION III: PHYSICAL & CHEMICAL CHARACTERISTICS

BOILING POINT (760mmHg):	~388	SPEC.GRAVITY(@ 68F):	1.11
VAPOR PRESSURE(mmHg 68F):	0.05	MELTING POINT (F):	~9
VAPOR DENSITY (air=1):	2.14	EVAPORATION RATE(BuAc=1):	N/E
PERCENT VOLATILE BY VOLUME:	N/E	VISCOSITY (68C):	21cps
		pH-VALUE:	N/E
SOLUB.VALUE(g/100gH2O,68F):	N/E	CONCENTRATION (%/MOL):	N/E

SOLUBILITY: miscible with water, miscible with acetone, alcohol
APPEARANCE: liquid, hygroscopic, viscous
COLOR : colorless
ODOR : odorless or no characteristic odor, sweet

SECTION IV: FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (F): ~232
FP METHOD : CC (Closed cup)
AUTO IGNITION TEMP.(F): 752
FLAMMABLE LIMITS: -lower %: 3.20
-upper %:

NFPA FLAMMABILITY RATING: Burns only if pre-heated (1)
OSHA FLAMMABILITY CLASS : Combustible liquid - Class IIIB

FIRE AND EXPLOSION HAZARD DATA (continued ...)

EXTINGUISHING MEDIA: water, foam, carbon dioxide (CO2), dry chemicals, sand, dolomite etc.

SPECIAL FIRE FIGHTING PROCEDURES
No specific fire fighting procedures noted.

EVACUATION PROCEDURES
No specific evacuation procedures noted.

NIOSH RESPIRATOR RECOMMENDATION
No specific recommendation made, but respiratory protection may still be required under exceptional circumstances when excessive air contamination exists.

UNUSUAL FIRE & EXPLOSION HAZARDS
May develop highly toxic or corrosive fumes if heated.

SECTION V: REACTIVITY DATA & PHYSICAL HAZARDS

STABILITY:	Unknown
CONDITIONS TO AVOID:	Avoid heat, sparks, flames, moisture
REACTIVITY INDEX:	Unstable if heated (1)

HAZARDOUS DECOMPOSITION OR BYPRODUCTS: N/E

HAZARDOUS POLYMERIZATION:	N/E
CONDITIONS TO AVOID:	N/E
WATER REACTIVE?:	No
AIR REACTIVE? :	No

INCOMPATIBLE SPECIFIC CHEMICALS:
CHLOROSULFONIC ACID, OLEUM, PHOSPHORUS PENTASULFIDE, SULFURIC ACID

INCOMPATIBLE CLASSES OF CHEMICALS: Acids, oxidizing. Strong oxidizing agents

INCOMPATIBLE CONDITIONS:

SECTION VI: HEALTH HAZARD INFORMATION

ROUTES OF ENTRY: ingestion, skin and/or eye contact

TARGET ORGANS : central nervous system, heart & cardiovascular system, kidneys, liver, respiratory system, lungs, brain

TOXIC DOSE (LD 50): 4700mg/kg (oral rat)

TOXICITY INDEX : Low toxicity (2)

PERMISSIBLE EXPOSURE LIMITS:

FED-OSHA PEL:	50ppm(c)
ACGIH TWA:	50ppm(c)
ACGIH STEL:	No std.
NIOSH PEL:	No std.
NIOSH IDLH:	No std.
CAL-OSHA PEL:	50ppm(c)

CARCINOGENICITY:

NTP?	NO
IARC?	NO
OSHA?	NO

TOXICOLOGICAL INFORMATION: None entered

HEALTH HAZARD INFORMATION (continued ...)

HEALTH WARNINGS
Gas or vapor is harmful on prolonged exposure or in high concentrations. Narcotic effect. Nephrotoxin.

ACUTE & CHRONIC HEALTH HAZARDS
chronic respiratory failure. Swallowing concentrated chemical may cause severe internal injury, liver and/or kidney damage

SIGNS AND SYMPTOMS OF EXPOSURE
nausea, vomiting, central nervous system depression, drowsiness, dizziness, disorientation, vertigo

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
No notation of medical conditions generally aggravated by exposure

EMERGENCY AND FIRST AID PROCEDURES
EYE CONTACT: Promptly wash eyes with lots of water while lifting the eye lids. Get medical attention if any discomfort continues.
SKIN CONTACT: Remove victim from source of contamination. Promptly wash contaminated skin w/soap or mild detergent and water. Promptly remove clothing if soaked through and wash as above. Get medical attention promptly if symptoms occur after washing.
INHALATION: Move the exposed person to fresh air at once. Perform artificial respiration if breathing has stopped. Keep the affected person warm and at rest. Get prompt medical attention.
INGESTION: NEVER MAKE AN UNCONSCIOUS PERSON VOMIT OR DRINK FLUIDS! Get medical attention.

SECTION VII: PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Ventilate well, stop flow of gas or liquid if possible. Remove ignition sources. Do not allow chemical to enter confined spaces such as sewers due to explosion risk. Sewers designed to preclude formation of explosive concentrations of vapor may be permitted. Absorb small quantities with paper towels and evaporate in safe place (fume hood). Allow sufficient time for vapors to completely clear the hood ducts, then burn the paper in a location away from combustible materials. Collect with noncombustible absorbent material. Flush with water. Dike for large spills. Let evaporate. Keep out of confined spaces because of explosion risk. Clean-up personnel should use respiratory and/or liquid contact protection.

WASTE DISPOSAL
Incinerate in suitable combustion chamber. Dilute w/organic solvent and incinerate using effluent gas cleaner. Collect on absorbent material, place in cardboard kegs and incinerate. Confirm disposal procedures with environmental engineer and local regulations. Wash to drains with copious amounts of water and inform treatment plant operator.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Keep in cool, dry, ventilated storage and closed containers. Misc.hazardous material storage.

PRECAUTIONS FOR SAFE HANDLING AND USE (continued ...)

OTHER PRECAUTIONS

Keep away from heat, sparks and open flame. Avoid spilling, skin and eye contact. Ventilate well, avoid breathing vapors or dust. Use approved respirator if air contamination is above accepted level. Avoid acids, moisture, and combustible materials. Read and follow manufacturer's recommendations.

SECTION VIII: PROTECTION AND CONTROL MEASURES

RESPIRATORY PROTECTION (required above 50ppm(c))

No specific recommendation made, but respiratory protection may still be required under exceptional circumstances when excessive air contamination exists.

PROTECTIVE GLOVES: Use protective gloves made of butyl rubber, rubber (natural, latex), neoprene, polyvinyl chloride (PVC)

EYE PROTECTION: Wear chemical safety goggles where eye exposure is reasonably probable.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT: No specific protective equipment noted, but may be required anyway.

HYGIENIC WORK PRACTICES: No specific hygiene procedures noted, but good personal hygiene practices are always advisable, especially when working with chemicals.

VENTILATION REQUIREMENTS: No specific ventilation requirements noted, but forced ventilation may still be required if air contamination exceeds acceptable level.

SECTION IX: ADDITIONAL INFORMATION

ENVIRONMENTAL LISTINGS

Clean Air Act, S.111 (40 CFR 60-EPA). NTP-Annual Plan (DHHS). SARA Section 313: Toxic Chemicals. SARA Title III Consolidated Chemical List (302,CERCLA,313,RCRA)

Listed data compared to manufacturer's MSDS? NO

NOTE: Use with caution! Data may not reflect manufacturer's recommendations.

Verified and approved for use by: No name noted on

Revised by: No name noted on

End of MSDS

GASOLINE

MATERIAL SAFETY DATA SHEET

Safechem No.: 442
Serial No.:

GASOLINE

EMERGENCY TELEPHONES:
CHEMTREC: 800-424-9300
MANUFACTURER: Vendor phone # not noted
COMPANY RESP.: Emergency phone not noted
MSDS PREPARATION DATE:

FIRE HAZARDS		scale
HEALTH	2	0=not ent
FLAMMABILITY	4	*1=slight
REACTIVITY	0	*2=moder.
		*3=high
*) NFPA		*4=extreme
		5=unknown
		6=no impact

SECTION I: IDENTITY

SYNONYMS & TRADE NAMES [Family]: #)Trade names
BENZIN, MOTOR SPIRITS, PETROL, [Aliphatic hydrocarbon]

FORMULA: N/E
HAZARD CLASS: Flammable Liquid
MANUF. NAME : Vendor name not noted
ADDRESS : Vendor address not noted
Vendor city, state, zip not noted
UN CLASS :

MOL. WEIGHT: N/E
EPA #: N/E
CAS #: 8006-61-9
NIOSH #: LX3300000
DOT/UN/NA #: 1203
PART #: N/E

SECTION II: HAZARDOUS INGREDIENTS

This is a single-component chemical

SECTION III: PHYSICAL & CHEMICAL CHARACTERISTICS

BOILING POINT (760mmHg):	N/E	SPEC.GRAVITY(@ 68F):	0.8
VAPOR PRESSURE(mmHg) :	N/E	MELTING POINT (F):	N/E
VAPOR DENSITY (air=1):	3.50	EVAPORATION RATE(BuAc=1):	N/E
PERCENT VOLATILE BY VOLUME:	N/E	VISCOSITY:	N/E
		pH-VALUE:	N/E
SOLUB.VALUE(g/100gH2O,68F):	N/E	CONCENTRATION (%/MOL):	N/E

SOLUBILITY: insoluble in water, soluble in alcohol, chloroform, aromatic hydrocarbons
APPEARANCE: liquid, clear, mobile
COLOR : colorless, light (or pale), yellow
ODOR : characteristic, gasoline

SECTION IV: FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (F): ~-50
FP METHOD : N/E
AUTO IGNITION TEMP.(F): 536
FLAMMABLE LIMITS: -lower %: 1.30
-upper %: 6

NFPA FLAMMABILITY RATING: Extremely flammable (4)
OSHA FLAMMABILITY CLASS : Flammable liquid - Class IA

FIRE AND EXPLOSION HAZARD DATA (continued ...)

EXTINGUISHING MEDIA: water spray, fog or mist, foam, carbon dioxide (CO_2), dry chemicals, sand, dolomite etc. stop flow of material to fire

SPECIAL FIRE FIGHTING PROCEDURES

Keep run-off water out of sewers and water sources. Dike for water control. Cool containers exposed to flames with water from the side until well after fire is out. Move container from fire area if it can be done without risk. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire. For massive fire in cargo area: use unmanned hose holder or monitor nozzles, if possible. If not: withdraw and let fire burn out. If water pollution occurs, notify appropriate authorities.

EVACUATION PROCEDURES

Isolate in all directions if tank car or truck is involved in fire. Keep unnecessary people away,isolate hazard area and deny entry. Stay upwind and keep out of low areas.

NIOSH RESPIRATOR RECOMMENDATION

DOT Recommendation: Wear positive pressure breathing apparatus and special protective clothing.

UNUSUAL FIRE & EXPLOSION HAZARDS

May explode in a fire. May form explosive or toxic mixtures with air. May explode when heated, exposed to flames or sparks, or when rubbed. May travel considerable distance to source of ignition and flash back. Vapor explosion and poison hazard indoors, outdoors and in sewers.

SECTION V: REACTIVITY DATA & PHYSICAL HAZARDS

STABILITY:	Unknown
CONDITIONS TO AVOID:	Avoid heat, sparks, flames, moisture
REACTIVITY INDEX:	N/E

HAZARDOUS DECOMPOSITION OR BYPRODUCTS: Very flammable gases/vapors/fumes of: Very toxic gases/vapors/fumes of carbon monoxide (CO), carbon dioxide (CO_2), hydrocarbons

HAZARDOUS POLYMERIZATION:	N/E
CONDITIONS TO AVOID:	N/E
WATER REACTIVE?:	No
AIR REACTIVE? :	No

INCOMPATIBLE SPECIFIC CHEMICALS:

INCOMPATIBLE CLASSES OF CHEMICALS: Strong oxidizing agents

INCOMPATIBLE CONDITIONS:

SECTION VI: HEALTH HAZARD INFORMATION

ROUTES OF ENTRY: inhalation, skin absorption

TARGET ORGANS : central nervous system, eyes, gastro-intestinal tract, kidneys, liver, respiratory system, lungs, skin

TOXIC DOSE (LD 50): N/E

TOXICITY INDEX : Moderately toxic (3)

PERMISSIBLE EXPOSURE LIMITS:

FED-OSHA PEL:	300ppm
ACGIH TWA:	300ppm
ACGIH STEL:	500ppm
NIOSH PEL:	No std.
NIOSH IDLH:	No std.
CAL-OSHA PEL:	300ppm

CARCINOGENICITY:

NTP?	NO
IARC?	NO
OSHA?	NO

TOXICOLOGICAL INFORMATION: None entered

HEALTH WARNINGS

Gas or vapor is harmful on prolonged exposure or in high concentrations. Gas or vapor displaces oxygen available for breathing (asphyxiant). This chemical may cause skin/eye irritation and burns (corrosive effect). Narcotic effect. CNS depressant.

ACUTE & CHRONIC HEALTH HAZARDS

May cause chemical eye burns, pneumonitis (inflammation of lung tissue). Contact with concentrated chemical may cause severe skin damage. Swallowing concentrated chemical may cause severe internal injury

SIGNS AND SYMPTOMS OF EXPOSURE

Irritation of eyes and mucous membranes, severe pulmonary irritation, may cause suffocation, severe skin irritation, cyanosis (blue tissue condition: nails, lips, and/or skin), nausea, vomiting, drowsiness, dizziness, disorientation, vertigo, dizziness

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE

Skin disorders and allergies

EMERGENCY AND FIRST AID PROCEDURES

EYE CONTACT: Promptly wash eyes with lots of water while lifting the eye lids. Continue to rinse for at least 15 minutes and get medical attention.

SKIN CONTACT: Remove victim from source of contamination. Promptly wash contaminated skin w/soap or mild detergent and water. Promptly remove clothing if soaked through and wash as above.

INHALATION: Move the exposed person to fresh air at once. Perform artificial respiration if breathing has stopped. When breathing is difficult, properly trained personnel may assist affected person by administering 100% oxygen. Keep the affected person warm and at rest. Get prompt medical attention.

INGESTION: NEVER MAKE AN UNCONSCIOUS PERSON VOMIT OR DRINK FLUIDS! Consult a physician for specific advice.

SECTION VII: PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Ventilate well, stop flow of gas or liquid if possible. Remove ignition sources. Do not allow chemical to enter confined spaces such as sewers due to explosion risk. Sewers designed to preclude formation of explosive concentrations of vapor may be permitted. Absorb small quantities with paper towels and evaporate in safe place (fume hood). Allow sufficient time for vapors to completely clear the hood ducts, then burn the paper in a location away from combustible materials. Collect with noncombustible absorbent material. Flush with water. Dike for large spills. Let evaporate. Keep out of confined spaces because of explosion risk. Provide ventilation and confine the spill. Do not allow runoff to sewer.

WASTE DISPOSAL

Incinerate in suitable combustion chamber. Absorb in vermiculite or dry sand, dispose in licensed special waste. Dike far ahead of spill for later disposal. Collect on absorbent material, place in cardboard kegs and incinerate. Confirm disposal procedures with environmental engineer and local regulations.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Flammable/combustible: Keep away from oxidizers, heat and flames. Keep in cool, dry, ventilated storage and closed containers. Ground container and transfer equipment to eliminate static electricity sparks.

Flammable liquid storage

OTHER PRECAUTIONS

Keep away from heat, sparks and open flame. Avoid spilling, skin and eye contact. Ventilate well, avoid breathing vapors or dust. Use approved respirator if air contamination is above accepted level. Avoid acids, moisture, and combustible materials. Read and follow manufacturer's recommendations. Wear full protective clothing for prolonged exposure and/or high conc.

SECTION VIII: PROTECTION AND CONTROL MEASURES

RESPIRATORY PROTECTION (required above 300ppm)

No specific recommendation made, but respiratory protection may still be required under exceptional circumstances when excessive air contamination exists.

PROTECTIVE GLOVES: Use protective gloves made of nitrile. P.T.F.E. viton rubber (fluor rubber)

EYE PROTECTION: Wear chemical safety goggles where eye exposure is reasonably probable.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT: Use engineering controls to reduce air contamination to permissible levels. Provide eyewash, quick drench. Wear appropriate clothing to prevent any possibility of skin contact.

HYGIENIC WORK PRACTICES: Wash at end of each work shift & before eating, smoking & using toilet. Wash promptly if skin becomes wet. Promptly remove any clothing that becomes wet or contaminated. Isolate

PROTECTION AND CONTROL MEASURES (continued ...)

contaminated clothing and wash before reuse.
VENTILATION REQUIREMENTS: Provide adequate general and local exhaust ventilation.

SECTION IX: ADDITIONAL INFORMATION
ENVIRONMENTAL LISTINGS
Hazardous waste (Calif.Adm.Code-T 22). DOT Hazardous Mat.Transp.Act(49 CFR). ACGIH Threshold Limit Values

Listed data compared to manufacturer's MSDS? NO
NOTE: Use with caution! Data may not reflect manufacturer's recommendations.
Verified and approved for use by: No name noted on
Revised by: No name noted on

End of MSDS

ISOPROPO ALCOHOL

MATERIAL SAFETY DATA SHEET

Serial #: **Safechem #:** 512

ISOPROPYL ALCOHOL

EMERGENCY TELEPHONES:
CHEMTREC: 800-424-9300
MANUFACTURER: Vendor phone # not noted
COMPANY RESP.: Emergency phone not noted
MSDS PREPARATION DATE:

FIRE HAZARDS		scale
HEALTH	1	0=not ent
FLAMMABILITY	3	*1=slight
REACTIVITY	1	*2=moder.
		*3=high
*) **NFPA**		*4=extreme
		5=unknown
		6=no impact

SECTION I: IDENTITY

SYNONYMS & TRADE NAMES [Family]: #)**Trade names**
2-PROPANOL, DIMETHYL CARBINOL, IPA, ISOHOL, ISOPROPANOL, PETROHOL, PROPAN-2-OL, sec-PROPYL ALCOHOL, [Aliphatic alcohol]

FORMULA: C3-H8-O
HAZARD CLASS: Flammable Liquid

MANUF. NAME : Vendor name not noted
ADDRESS : Vendor address not noted
Vendor city, state, zip not noted
UN CLASS : CLASS 3 FLAMMABLE LIQUIDS

MOL. WEIGHT: 60.11
EPA #: N/E
CAS #: 67-63-0
NIOSH #: NT8050000
DOT/UN/NA #: 1219
PART #: N/E

SECTION II: HAZARDOUS INGREDIENTS

This is a single-component chemical

SECTION III: PHYSICAL & CHEMICAL CHARACTERISTICS

BOILING POINT (760mmHg):	~180	**SPEC.GRAVITY**(@ 68F):	0.785
VAPOR PRESSURE(mmHg) :	33	**MELTING POINT** (F):	~-128
VAPOR DENSITY (air=1):	2.07	**EVAPORATION RATE**(BuAc=1):	2.83
PERCENT VOLATILE BY VOLUME:	N/E	**VISCOSITY:**	N/E
		pH-VALUE:	N/E
SOLUB.VALUE(g/100gH2O,68F):	N/E	**CONCENTRATION** (%/MOL):	N/E

SOLUBILITY: miscible with water, miscible with alcohol, ether
APPEARANCE: liquid
COLOR : colorless
ODOR : rubbing alcohol

SECTION IV: FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (F): ~53
FP METHOD : CC (Closed cup)
AUTO IGNITION TEMP.(F): 750
FLAMMABLE LIMITS: **-lower** %: 2.50
-upper %: 12.70

NFPA FLAMMABILITY RATING: Ignites easily (3)
OSHA FLAMMABILITY CLASS : Flammable liquid - Class IB

FIRE AND EXPLOSION HAZARD DATA (continued ...)

EXTINGUISHING MEDIA: "alcohol" foam, carbon dioxide (CO2), dry chemicals, sand,dolomite etc.

SPECIAL FIRE FIGHTING PROCEDURES

If a leak or spill has not ignited,use water spray to disperse vapors and protect men stopping the leak. Keep run-off water out of sewers and water sources. Dike for water control. Cool containers exposed to flames with water from the side until well after fire is out. Move container from fire area if it can be done without risk. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire. Use water spray to reduce vapors. For massive fire in cargo area: use unmanned hose holder or monitor nozzles,if possible. If not,withdraw and let fire burn out. If water pollution occurs,notify appropriate authorities.

EVACUATION PROCEDURES

Isolate in all directions if tank car or truck is involved in fire. Keep unnecessary people away,isolate hazard area and deny entry. Isolate in all directions if small spill or leak: Stay upwind and keep out of low areas.

NIOSH RESPIRATOR RECOMMENDATION

DOT Recommendation: Wear positive pressure breathing apparatus and special protective clothing.

UNUSUAL FIRE & EXPLOSION HAZARDS

May explode in a fire. May develop highly toxic or corrosive fumes if heated. May form explosive or toxic mixtures with air. May explode when heated,exposed to flames or sparks,or when rubbed. May travel considerable distance to source of ignition and flash back. Vapor explosion and poison hazard indoors,outdoors and in sewers.

SECTION V: REACTIVITY DATA & PHYSICAL HAZARDS

STABILITY:	Unknown
CONDITIONS TO AVOID:	Avoid heat,sparks,flames, moisture
REACTIVITY INDEX:	Unstable if heated (1)
HAZARDOUS DECOMPOSITION OR BYPRODUCTS:	N/E
HAZARDOUS POLYMERIZATION:	N/E
CONDITIONS TO AVOID:	N/E
WATER REACTIVE?:	No
AIR REACTIVE? :	No

INCOMPATIBLE SPECIFIC CHEMICALS:
ALUMINUM, CROTONALDEHYDE, OLEUM, PHOSGENE, POTASSIUM-tert-BUTOXIDE

OTHER INCOMPATIBLE CHEMICALS & MIXTURES: Aluminum-tri-isopropoxide, Cobaltous chloride (CoCl2), Nitroform

INCOMPATIBLE CLASSES OF CHEMICALS: Strong oxidizing agents

INCOMPATIBLE CONDITIONS:

SECTION VI: HEALTH HAZARD INFORMATION

ROUTES OF ENTRY: inhalation, ingestion, skin and/or eye contact

TARGET ORGANS : central nervous system, eyes, respiratory system,lungs, skin

LETHAL DOSE (LD 50): 5840mg/kg (oral rat)

TOXICITY INDEX : Low toxicity (2)

PERMISSIBLE EXPOSURE LIMITS:

FED-OSHA PEL:	400ppm
ACGIH TWA:	400ppm
ACGIH STEL:	500ppm
NIOSH PEL:	400ppm
NIOSH STEL:	500ppm
CAL-OSHA PEL:	400ppm

CARCINOGENICITY:

NTP?	NO
IARC?	YES
OSHA?	NO

TOXICOLOGICAL INFORMATION: None entered

HEALTH WARNINGS

Exposure: This chemical has good warning properties. Gas or vapor is harmful on prolonged exposure or in high concentrations. Irritant of eyes and mucous membranes. Toxic through skin absorption (percutaneous). Narcotic effect. CNS depressant.

ACUTE & CHRONIC HEALTH HAZARDS

May cause chemical eye burns. Swallowing concentrated chemical may cause severe internal injury, unconsciousness,death

SIGNS AND SYMPTOMS OF EXPOSURE

Irritation of eyes and mucous membranes, dilated pupils, rhinitis (inflammation of the nasal mucous membranes), upper respiratory irritation, general respiratory distress,unproductive cough, may cause suffocation, skin irritation, nausea,vomiting, unconsciousness, possibly death, central nervous system depression, drowsiness, dizziness,disorientation,vertigo, behavioral changes, hypotension (low blood pressure), dizziness

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE

Convulsive disorders,CNS problems

EMERGENCY AND FIRST AID PROCEDURES

No recommendation given.

FIRST AID - EYES: Promptly wash eyes with lots of water while lifting the eye lids. Get medical attention immediately. Continue to rinse.

FIRST AID - SKIN: Remove affected person from source of contamination. Promptly flush contaminated skin with water. Promptly remove clothing if soaked through and flush the skin with water. Get medical attention if irritation persists after washing.

FIRST AID - INHALATION: Move the exposed person to fresh air at once. Perform artificial respiration if breathing has stopped. Keep the affected person warm and at rest. Get prompt medical attention.

FIRST AID - INGESTION: NEVER MAKE AN UNCONSCIOUS PERSON VOMIT OR DRINK FLUIDS! If medical attention is not immediately available: Try to induce vomiting by having affected person touch back of the throat with his finger or by giving him syrup of ipecac as directed on the package. Get medical attention immediately!

SECTION VII: PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Ventilate well,stop flow of gas or liquid if possible. Remove ignition sources. Do not allow chemical to enter confined spaces such as sewers due to explosion risk. Sewers designed to preclude formation of explosive concentrations of vapor may be permitted. Absorb small quantities with paper towels and evaporate in safe place (fume hood). Allow sufficient time for vapors to completely clear the hood ducts, then burn the paper in a location away from combustible materials. Let evaporate. Keep out of confined spaces because of explosion risk. Provide ventilation and confine the spill. Do not allow runoff to sewer. Clean-up personnel should use respiratory and/or liquid contact protection.

WASTE DISPOSAL

Incinerate in suitable combustion chamber. Absorb in vermiculite or dry sand,dispose in licensed special waste. Collect on absorbent material,place in cardboard kegs and incinerate. Confirm disposal procedures with environmental engineer and local regulations.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Flammable/combustible: Keep away from oxidizers,heat and flames. May attack some plastics,rubber and coatings. Keep in cool,dry,ventilated storage and closed containers.

Flammable liquid storage

OTHER PRECAUTIONS

Keep away from heat,sparks and open flame. Avoid spilling,skin and eye contact. Ventilate well,avoid breathing vapors or dust. Use approved respirator if air contamination is above accepted level. Avoid acids, moisture,and combustible materials. Read and follow manufacturer's recommendations. Wear full protective clothing for prolonged exposure and/or high conc.

SECTION VIII: PROTECTION AND CONTROL MEASURES

RESPIRATORY PROTECTION (required above 400ppm)

UP TO 1000 ppm:

CCROVF: CCR with organic vapor respirator and full facepiece.

For higher contamination levels: see PROTECTION DATA section

PROTECTIVE GLOVES: Use protective gloves made of nitrile

EYE PROTECTION: Wear splash-proof eye goggles to prevent any possibility of eye contact.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT: Use engineering controls to reduce air contamination to permissible levels. Provide eyewash,quick drench. Wear appropriate clothing to prevent any possibility of skin contact. Wear appropriate clothing to prevent repeated or prolonged skin contact.

HYGIENIC WORK PRACTICES: Wash at end of each work shift & before eating, smoking & using toilet. Wash promptly if skin becomes wet. Promptly remove any clothing that becomes wet or contaminated. Contaminated clothing to be placed in closed container until disposal or

PROTECTION AND CONTROL MEASURES (continued ...)

decontamination. Warn cleaning personnel of chemical's hazardous properties.

VENTILATION REQUIREMENTS: Provide adequate general and local exhaust ventilation. Work in fume hood.

SECTION IX: ADDITIONAL INFORMATION

ENVIRONMENTAL LISTINGS

IARC-Int. Agency for Research Cancer. DOT Hazardous Mat.Transp.Act(49 CFR). NIOSH Criteria Documents. OSHA Chemical Hazard Communic. Std. Air Contaminants (29CFR1910). ACGIH Threshold Limit Values. SARA Section 313: Toxic Chemicals. SARA Title III Consolidated Chemical List (302,CERCLA,313,RCRA)

Listed data compared to manufacturer's MSDS? YES

NOTE: Use with caution! Data may not reflect manufacturer's recommendations.

Verified and approved for use by: No name noted on

Revised by: No name noted on

End of MSDS

Date: Fri May 20 14:52:44 1994

Sign:_____

METHYL ALCOHOL

MATERIAL SAFETY DATA SHEET

Safechem No.: 581
Serial No.:

METHYL ALCOHOL

EMERGENCY TELEPHONES:
CHEMTREC: 800-424-9300
MANUFACTURER: Vendor phone # not noted
COMPANY RESP.: Emergency phone not noted
MSDS PREPARATION DATE:

FIRE HAZARDS		scale
HEALTH	3	0=not ent
FLAMMABILITY	3	*1=slight
REACTIVITY	1	*2=moder.
		*3=high
*) NFPA		*4=extreme
		5=unknown
		6=no impact

SECTION I: IDENTITY

SYNONYMS & TRADE NAMES [Family]: #)Trade names
CARBINOL, COLONIAN SPIRIT, COLUMBIAN SPIRITS, METHANOL, METHYL HYDROXIDE, MONOHYDROXYMETHANE, PYROXYLIC SPIRIT, WOOD ALCOHOL, WOOD NAPHTHA, WOOD SPIRIT, [Aliphatic alcohol]

FORMULA: C-H4-O
HAZARD CLASS: Flammable Liquid

MANUF. NAME : Vendor name not noted
ADDRESS : Vendor address not noted
Vendor city, state, zip not noted
UN CLASS : CLASS 3 FLAMMABLE LIQUIDS

MOL. WEIGHT: 32.05
EPA #: U154
CAS #: 67-56-1
NIOSH #: PC1400000
DOT/UN/NA #: 1230
PART #: N/E

SECTION II: HAZARDOUS INGREDIENTS

This is a single-component chemical

SECTION III: PHYSICAL & CHEMICAL CHARACTERISTICS

BOILING POINT (760mmHg):	~148	SPEC.GRAVITY(@ 68F):	0.792
VAPOR PRESSURE(mmHg 68F):	97	MELTING POINT (F):	~-144
VAPOR DENSITY (air=1):	1.11	EVAPORATION RATE(BuAc=1):	5.9
PERCENT VOLATILE BY VOLUME:	N/E	VISCOSITY:	N/E
		pH-VALUE:	N/E
SOLUB.VALUE(g/100gH2O,68F):	N/E	CONCENTRATION (%/MOL):	N/E

SOLUBILITY: miscible with water, miscible with ethanol, ether, benzene, organic solvents (most)
APPEARANCE: liquid, clear, mobile
COLOR : colorless
ODOR : alcohol, characteristic, pungent

SECTION IV: FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (F): ~52
FP METHOD : N/E
AUTO IGNITION TEMP.(F): 752
FLAMMABLE LIMITS: -lower %: 6.70
-upper %: 36

NFPA FLAMMABILITY RATING: Ignites easily (3)

FIRE AND EXPLOSION HAZARD DATA (continued ...)

OSHA FLAMMABILITY CLASS : Flammable liquid - Class IB

EXTINGUISHING MEDIA: water spray, fog or mist, foam, "alcohol" foam, carbon dioxide (CO2), dry chemicals, sand, dolomite etc.

SPECIAL FIRE FIGHTING PROCEDURES

Keep run-off water out of sewers and water sources. Dike for water control. Cool containers exposed to flames with water from the side until well after fire is out. Move container from fire area if it can be done without risk. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire. Use water spray to reduce vapors. Do not scatter spilled material with more water than needed to fight fire. If water pollution occurs, notify appropriate authorities.

EVACUATION PROCEDURES

Isolate in all directions if tank car or truck is involved in fire. Keep unnecessary people away,isolate hazard area and deny entry. Stay upwind and keep out of low areas.

NIOSH RESPIRATOR RECOMMENDATION

DOT Recommendation: Wear positive pressure breathing apparatus and special protective clothing.

UNUSUAL FIRE & EXPLOSION HAZARDS

May explode in a fire. May develop highly toxic or corrosive fumes if heated. May form explosive or toxic mixtures with air. May explode when heated, exposed to flames or sparks, or when rubbed. May travel considerable distance to source of ignition and flash back. Vapor explosion and poison hazard indoors, outdoors and in sewers.

SECTION V: REACTIVITY DATA & PHYSICAL HAZARDS

STABILITY:	Unknown
CONDITIONS TO AVOID:	Avoid heat, sparks, flames, moisture
REACTIVITY INDEX:	Unstable if heated (1)
HAZARDOUS DECOMPOSITION OR BYPRODUCTS:	Toxic gases/vapors/fumes of carbon monoxide (CO)
HAZARDOUS POLYMERIZATION:	N/E
CONDITIONS TO AVOID:	N/E
WATER REACTIVE?:	No
AIR REACTIVE? :	No

INCOMPATIBLE SPECIFIC CHEMICALS:

CHLOROFORM, CHROMIUM TRIOXIDE, PERCHLORIC ACID, PERCHLORYL FLUORIDE, POTASSIUM-tert-BUTOXIDE

INCOMPATIBLE CLASSES OF CHEMICALS: Strong oxidizing agents

INCOMPATIBLE CONDITIONS:

SECTION VI: HEALTH HAZARD INFORMATION

ROUTES OF ENTRY: inhalation, ingestion, skin and/or eye contact

TARGET ORGANS : central nervous system, eyes, gastro-intestinal tract, heart & cardiovascular system, skin

TOXIC DOSE (LD 50): 5628mg/kg (oral rat)

TOXICITY INDEX : Moderately toxic (3)

PERMISSIBLE EXPOSURE LIMITS:

FED-OSHA PEL:	200ppm(s)	
ACGIH TWA:	200ppm(s)	CARCINOGENICITY:
ACGIH STEL:	250ppm(s)	NTP? NO
NIOSH PEL:	200ppm	IARC? NO
NIOSH IDLH:	25000ppm	OSHA? NO
CAL-OSHA PEL:	200ppm(s)	

TOXICOLOGICAL INFORMATION: None entered

HEALTH WARNINGS

Gas or vapor is harmful on prolonged exposure or in high concentrations. This chemical may cause skin/eye irritation and burns (corrosive effect). Toxic through skin absorption (percutaneous). Narcotic effect.

ACUTE & CHRONIC HEALTH HAZARDS

Repeated exposure may cause chronic eye irritation. May cause chemical eye burns, acute eczematous dermatitis, contact type (erythema, edema, papules, vesicles, bullae, crusts, desquamation). Swallowing concentrated chemical may cause severe internal injury

SIGNS AND SYMPTOMS OF EXPOSURE

Extreme irritation of eyes and mucous membranes, including burning and tearing. visual disturbances, incl. blurred vision, respiratory failure, death, severe skin irritation, nausea, vomiting, headache, behavioral changes, tremors, convulsions

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE

Skin disorders and allergies

EMERGENCY AND FIRST AID PROCEDURES

EYE CONTACT: Promptly wash eyes with lots of water while lifting the eye lids. Continue to rinse for at least 15 minutes and get medical attention.

SKIN CONTACT: Remove victim from source of contamination. Promptly flush contaminated skin w/water. Promptly remove clothing if soaked through and flush the skin with water.

INHALATION: Move the exposed person to fresh air at once. Perform artificial respiration if breathing has stopped. When breathing is difficult, properly trained personnel may assist affected person by administering 100% oxygen. Keep the affected person warm and at rest. Get prompt medical attention.

INGESTION: NEVER MAKE AN UNCONSCIOUS PERSON VOMIT OR DRINK FLUIDS! Get medical attention immediately! NOTE: Effects may be delayed. Keep victim under observation. NOTE: Keep victim away from heat, sparks and flames!

CAUTION First aid personnel: Beware of own health risk during rescue!

SECTION VII: PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Ventilate well, stop flow of gas or liquid if possible. Remove ignition sources. Do not allow chemical to enter confined spaces such as sewers due to explosion risk. Sewers designed to preclude formation of explosive concentrations of vapor may be permitted. Stop leak if possible without risk. DO NOT touch spilled material! Absorb small quantities with paper towels and evaporate in safe place (fume hood). Allow sufficient time for vapors to completely clear the hood ducts, then burn the paper in a location away from combustible materials. Let evaporate. Keep out of confined spaces because of explosion risk. Clean-up personnel should use respiratory and/or liquid contact protection.

WASTE DISPOSAL

Incinerate in suitable combustion chamber. Absorb in vermiculite or dry sand, dispose in licensed special waste. Collect on absorbent material, place in cardboard kegs and incinerate. Confirm disposal procedures with environmental engineer and local regulations.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Flammable/combustible: Keep away from oxidizers, heat and flames. May attack some plastics, rubber and coatings. Keep in cool, dry, ventilated storage and closed containers. Ground container and transfer equipment to eliminate static electricity sparks. Flammable liquid storage

OTHER PRECAUTIONS

Keep away from heat, sparks and open flame. Avoid spilling, skin and eye contact. Ventilate well, avoid breathing vapors or dust. Use approved respirator if air contamination is above accepted level. Avoid acids, moisture, and combustible materials. Read and follow manufacturer's recommendations. Wear full protective clothing for prolonged exposure and/or high conc. Do not use contact lenses.

SECTION VIII: PROTECTION AND CONTROL MEASURES

RESPIRATORY PROTECTION (required above 200ppm(s))

SCBA: Self-contained breathing apparatus.
For higher contamination levels: see PROTECTION DATA section

PROTECTIVE GLOVES: Use protective gloves made of butyl rubber. Polyvinylidene chloride/Polyethylene (PVD/PE)

EYE PROTECTION: Wear chemical safety goggles where eye exposure is reasonably probable. Contact lenses should not be worn when working with this chemical!

OTHER PROTECTIVE CLOTHING OR EQUIPMENT: Use engineering controls to reduce air contamination to permissible levels. Provide eyewash, quick drench. Wear appropriate clothing to prevent repeated or prolonged skin contact.

HYGIENIC WORK PRACTICES: Wash at end of each work shift & before eating, smoking & using toilet. Wash promptly if skin becomes wet. Promptly remove any clothing that becomes wet.

PROTECTION AND CONTROL MEASURES (continued ...)

VENTILATION REQUIREMENTS: Provide adequate general and local exhaust ventilation. Provide explosion proof ventilation for high concentrations.

SECTION IX: ADDITIONAL INFORMATION

ENVIRONMENTAL LISTINGS

CERCLA (EPA Superfund)-Comprehensive Environm.Response,Comp.Liability Act. Hazardous waste (Calif.Adm.Code-T 22). RCRA-Resource Conservation and Recovery Act (40 CFR 261-EPA). DOT Hazardous Mat.Transp.Act(49 CFR). NIOSH Criteria Documents. OSHA Chemical Hazard Communic. Std. Air Contaminants (29CFR1910). ACGIH Threshold Limit Values. SARA Section 313: Toxic Chemicals. SARA Title III Consolidated Chemical List (302,CERCLA,313,RCRA)

Listed data compared to manufacturer's MSDS? NO

NOTE: Use with caution! Data may not reflect manufacturer's recommendations.

Verified and approved for use by: No name noted on

Revised by: No name noted on

End of MSDS

PETROLEUM OIL

MATERIAL SAFETY DATA SHEET

Serial #: **Safechem #:** 719

PETROLEUM OIL

EMERGENCY TELEPHONES:
CHEMTREC: 800-424-9300
MANUFACTURER: Vendor phone # not noted
COMPANY RESP.: Emergency phone not noted
MSDS PREPARATION DATE:

FIRE HAZARDS		**scale**
HEALTH	1	0=not ent
FLAMMABILITY	2	*1=slight
REACTIVITY	1	*2=moder.
		*3=high
*) **NFPA**		*4=extreme
		5=unknown
		6=no impact

SECTION I: IDENTITY

SYNONYMS & TRADE NAMES [Family]: #)**Trade names**
COAL OIL@, CRUDE OIL, EARTH OIL, MINERAL OIL, OIL, OIL,PETROLEUM, ROCK OIL, SENECA OIL, [Hydrocarbons], CRUDE STEAM-CRACKED OILS, CRUDE THERMO-CRACKED OILS

FORMULA: N/E
HAZARD CLASS: Flammable/combustible liquid
MANUF. NAME : Vendor name not noted
ADDRESS : Vendor address not noted
Vendor city, state, zip not noted
UN CLASS :

MOL. WEIGHT: N/E
EPA #: N/E
CAS #: N/E
NIOSH #: N/E
DOT/UN/NA #: 1270
PART #: N/E

SECTION II: HAZARDOUS INGREDIENTS

This is a single-component chemical

SECTION III: PHYSICAL & CHEMICAL CHARACTERISTICS

BOILING POINT (760mmHg): N/E
VAPOR PRESSURE(mmHg) : N/E
VAPOR DENSITY (air=1): N/E
PERCENT VOLATILE BY VOLUME: N/E
SOLUB.VALUE(g/100gH2O,68F): N/E
SOLUBILITY: insoluble in water
APPEARANCE: liquid, oily
COLOR : black, brown, yellow
ODOR : N/E

SPEC.GRAVITY: 0
MELTING POINT (F): N/E
EVAPORATION RATE(BuAc=1): N/E
VISCOSITY: N/E
pH-VALUE: N/E
CONCENTRATION (%/MOL): N/E

SECTION IV: FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (F): N/E
FP METHOD : N/E
AUTO IGNITION TEMP.(F): N/E
FLAMMABLE LIMITS: **-lower %:**
-upper %:
NFPA FLAMMABILITY RATING: Burns only if heated moderately (2)

FIRE AND EXPLOSION HAZARD DATA (continued ...)

OSHA FLAMMABILITY CLASS : N/E
EXTINGUISHING MEDIA: water spray,fog or mist, foam, carbon dioxide (CO2), dry chemicals,sand,dolomite etc.
SPECIAL FIRE FIGHTING PROCEDURES
Keep run-off water out of sewers and water sources. Dike for water control. Cool containers exposed to flames with water from the side until well after fire is out. Move container from fire area if it can be done without risk. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire. For massive fire in cargo area: use unmanned hose holder or monitor nozzles,if possible. If not,withdraw and let fire burn out. If water pollution occurs,notify appropriate authorities.
EVACUATION PROCEDURES
Isolate in all directions if tank car or truck is involved in fire. Keep unnecessary people away,isolate hazard area and deny entry. Stay upwind and keep out of low areas.
NIOSH RESPIRATOR RECOMMENDATION
DOT Recommendation: Wear positive pressure breathing apparatus and special protective clothing.
UNUSUAL FIRE & EXPLOSION HAZARDS
May explode in a fire. May develop highly toxic or corrosive fumes if heated. May travel considerable distance to source of ignition and flash back. Vapor explosion and poison hazard indoors,outdoors and in sewers.

SECTION V: REACTIVITY DATA & PHYSICAL HAZARDS

STABILITY:	Unknown
CONDITIONS TO AVOID:	Avoid heat,sparks,flames
REACTIVITY INDEX:	Unstable if heated (1)
HAZARDOUS DECOMPOSITION OR BYPRODUCTS:	Toxic gases/vapors/fumes of carbon monoxide (CO), carbon dioxide (CO2), hydrocarbons
HAZARDOUS POLYMERIZATION:	N/E
CONDITIONS TO AVOID:	N/E
WATER REACTIVE?:	No
AIR REACTIVE? :	No

INCOMPATIBLE SPECIFIC CHEMICALS:
INCOMPATIBLE CLASSES OF CHEMICALS: Unspecified
INCOMPATIBLE CONDITIONS:

SECTION VI: HEALTH HAZARD INFORMATION
ROUTES OF ENTRY: inhalation, skin absorption
TARGET ORGANS : central nervous system, eyes, gastro-intestinal tract, respiratory system,lungs, skin
LETHAL DOSE (LD 50): N/E

HEALTH HAZARD INFORMATION (continued ...)

TOXICITY INDEX : Moderately toxic (3)
PERMISSIBLE EXPOSURE LIMITS:
FED-OSHA PEL: No std.
ACGIH TWA: 5mg/m3 (oil mist)
ACGIH STEL: No std.
NIOSH PEL: No std.
NIOSH STEL: No std.
CAL-OSHA PEL: 5mg/m3 (oil mist)

CARCINOGENICITY:
NTP? NO
IARC? YES
OSHA? NO

TOXICOLOGICAL INFORMATION: None entered
HEALTH WARNINGS
This chemical may cause skin/eye irritation and burns (corrosive effect). Known or suspected carcinogen for humans. CNS depressant.
ACUTE & CHRONIC HEALTH HAZARDS
Repeated exposure may cause chronic eye irritation. May cause chemical eye burns, acute eczematous dermatitis,contact type (erythema,edema, papules,vesicles,bullae,crusts,desquamation). Swallowing concentrated chemical may cause severe internal injury, unconsciousness,death
SIGNS AND SYMPTOMS OF EXPOSURE
Extreme irritation of eyes and mucous membranes,including burning and tearing. dilated pupils, may cause suffocation, severe skin irritation, nausea,vomiting, unconsciousness,possibly death, central nervous system depression, drowsiness,dizziness,disorientation,vertigo, behavioral changes, hypotension (low blood pressure), dizziness
MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
Skin disorders and allergies. Convulsive disorders,CNS problems
EMERGENCY AND FIRST AID PROCEDURES
Consult a physician for specific advice.
FIRST AID - EYES: Promptly wash eyes with lots of water while lifting the eye lids. Continue to rinse for at least 15 minutes and get medical attention.
FIRST AID - SKIN: Remove affected person from source of contamination. Promptly wash contaminated skin with soap or mild detergent and water. Promptly remove clothing if soaked through and wash as above.
FIRST AID - INHALATION: Move the exposed person to fresh air at once. Perform artificial respiration if breathing has stopped. When breathing is difficult,properly trained personnel may assist affected person by administering 100% oxygen. Keep the affected person warm and at rest. Get prompt medical attention.
FIRST AID - INGESTION: NEVER MAKE AN UNCONSCIOUS PERSON VOMIT OR DRINK FLUIDS!

SECTION VII: PRECAUTIONS FOR SAFE HANDLING AND USE
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Ventilate well,stop flow of gas or liquid if possible. Remove ignition sources. Do not allow chemical to enter confined spaces such as sewers due to explosion risk. Sewers designed to preclude formation of explosive concentrations of vapor may be permitted. Absorb small quantities with paper towels and evaporate in safe place (fume hood). Allow sufficient time for vapors to completely clear the hood ducts,

PRECAUTIONS FOR SAFE HANDLING AND USE (continued ...)

then burn the paper in a location away from combustible materials. Collect with noncombustible absorbent material. Flush with water. Dike for large spills. Let evaporate. Keep out of confined spaces because of explosion risk. Provide ventilation and confine the spill. Do not allow runoff to sewer. Clean-up personnel should use respiratory and/ or liquid contact protection.

WASTE DISPOSAL

Incinerate in suitable combustion chamber. Recover and reclaim or recycle,if practical. Dike far ahead of spill for later disposal. Collect on absorbent material,place in cardboard kegs and incinerate. Confirm disposal procedures with environmental engineer and local regulations.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Flammable/combustible: Keep away from oxidizers,heat and flames. May attack some plastics,rubber and coatings. Keep in cool,dry,ventilated storage and closed containers. Ground container and transfer equipment to eliminate static electricity sparks.
Flammable liquid storage

OTHER PRECAUTIONS

Keep away from heat,sparks and open flame. Avoid spilling,skin and eye contact. Ventilate well,avoid breathing vapors or dust. Use approved respirator if air contamination is above accepted level.

SECTION VIII: PROTECTION AND CONTROL MEASURES

RESPIRATORY PROTECTION

No specific recommendation made, but respiratory protection may still be required under exceptional circumstances when excessive air contamination exists.

PROTECTIVE GLOVES: Use suitable protective gloves if risk of skin contact.

EYE PROTECTION: Wear chemical safety goggles where eye exposure is reasonably probable.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT: Provide eyewash,quick drench. Wear appropriate clothing to prevent any possibility of skin contact.

HYGIENIC WORK PRACTICES: Wash at end of each work shift & before eating, smoking & using toilet. Wash promptly if skin becomes wet. Promptly remove any clothing that becomes wet or contaminated. Isolate contaminated clothing and wash before reuse.

VENTILATION REQUIREMENTS: Provide adequate general and local exhaust ventilation.

SECTION IX: ADDITIONAL INFORMATION

ENVIRONMENTAL LISTINGS

IARC-Int. Agency for Research Cancer. CERCLA (EPA Superfund)-Comprehensive Environm.Response,Comp.Liability Act. Hazardous waste (Calif.Adm.Code-T 22). Clean Water Act,S.304 (Priority Toxic Pollutants EPA). Extremely hazardous waste (Calif.Adm. Code, Title 22). DOT Hazardous Mat.Transp.Act(49 CFR)

ADDITIONAL INFORMATION (continued ...)

Listed data compared to manufacturer's MSDS? YES
NOTE: Use with caution! Data may not reflect manufacturer's recommendations.
Verified and approved for use by: No name noted on
Revised by: No name noted on

End of MSDS

Date: Fri May 20 15:42:07 1994

Sign: _____

PENTAERYTHRITE TETRANITRATE

MAR 0 C 1989

The
Ensign-Bickford
Company

Blasting Products Division
660 Hopmeadow Street
Simsbury, Connecticut 06070 USA
(203) 658-4411

Telex: 710 436 5050

Material Safety Data Sheets

Section I		
Manufacturer's Name The Ensign-Bickford Company		Emergency Telephone No. 1-203-658-4411
Address (Number,Street,City,State,Zip Code) 660 Hopmeadow Street, Simsbury, CT 06070		
Chemical Name & Synonyms NOT A CHEMICAL		Trade Name & Synonyms PRIMACORD © DETONATING CORD
Chemical Family N/A	Formula N/A	C.A.S. Number

Section II - Hazardous Ingredients	
Ingredient PENTAERYTHRITOL TETRANITRATE (PETN)	Percent
T.L.V.:	P.E.L.:
Ingredient CYCLOTRIMETHYLENE TRINITRAMINE (RDX)	Percent
T.L.V.:	P.E.L.:
Ingredient CYCLOTETRAMETHYLENE TETRANITRAMINE (HMX)	Percent
T.L.V.:	P.E.L.:
Ingredient 2,6-BIS(PICRYLAMINO)-3,5-DINITROPYRIDINE (PYX)	Percent
T.L.V.:	P.E.L.:

Section III - Physical Data

Boiling Point:	N/A	Specific Gravity:	N/A
Vapor Pressure:	N/A	Percent Volatile:	N/A
Vapor Density:	N/A	Evaporation Rate:	N/A
Solubility in Water:	N/A	Melting Point:	N/A
Appearance and Odor	CORE OF HIGH EXPLOSIVE WRAPPED IN TEXTILES AND/OR PLASTIC. THE CORE WILL CONTAIN 15-400 GR/FOOT OF ANY ONE OF THE LISTED EXPLOSIVES		

Section IV - Fire and Explosion Hazard Data

Flash Point:	N/A	(F):	Flamm.:	Lel: Uel:
Extinquishing Media:	NONE			
Special Firefighting Procedures	DO NOT FIGHT FIRE. ISOLATE AREA. EVACUATE PERSONNEL TO A SAFE PLACE.			
Unusual Fire and Explosion Hazards	MAY DETONATE IF OTHER OUTSIDE INFLUENCES ARE PRESENT. HAZARDOUS GASES PRODUCED IN A FIRE ARE NITROGEN OXIDES.			
Auto Ignition Temperature:	N/A			

Section V - Health Hazard Data

Threshold Limit Value: NOT ESTABLISHED

Effects of Overexposure

Eye Contact :	N/A - NOT A LIKELY ROUTE OF EXPOSURE
Skin Contact :	N/A - NOT A LIKELY ROUTE OF EXPOSURE
Inhalation:	N/A - NOT A LIKELY ROUTE OF EXPOSURE
Ingestion :	N/A - NOT A LIKELY ROUTE OF EXPOSURE

Emergency and First Aid Procedures

Eye Contact :	N/A
Skin Contact :	N/A
Inhalation:	IF DETONATION FUMES ARE INHALED REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL RESPIRATION, PREFERABLY MOUTH TO MOUTH. IF BREATHING IS DIFFICULT GIVE OXYGEN. CALL A PHYSICIAN.
Ingestion :	N/A

Section VI - Reactivity Data

Stability: STABLE	
Conditions to Avoid:	DETONATING CORDS BECOME LESS STABLE WITH HEAT. UNSTABLE WITH SHOCK.
Incompatability :	INCOMPATIBLE WITH ACIDS, ALKALIES.
Hazardous Decomp. : Products :	HAZARDOUS GASES PRODUCED ARE NITROGEN OXIDES.
Hazardous Polymerization:	WILL NOT OCCUR
Conditions to Avoid:	HEAT, SHOCK. AVOID BREATHING FUMES FROM DETONATION.

Section VII - Spill or Leak Procedures

Steps to be Taken : In Case Material is: Released or Spilled:	REVIEW FIRE & EXPLOSION HAZARDS AND SAFETY PRECAUTIONS BEFORE PROCEEDING WITH CLEAN UP. USE APPROPRIATE PERSONAL PROTECTION EQUIPMENT DURING CLEAN UP.
Waste Disposal Method :	CONSULT AN EXPLOSIVES MANUFACTURER FOR RECOMMENDED METHODS FOR DESTROYING EXPLOSIVE MATERIALS.

Section VIII - Specical Protection Information

Respiratory Protection	:	NONE
		Ventilation
Local Exhaust	:	N/A
Special	:	N/A
Mechanical	:	N/A
Other	:	N/A
Protective Gloves	:	NONE
Eye Protection	:	SAFETY GLASSES
Other Protective Equipment	:	NONE

Section IX - Specical Precautions

Precautions To Be Taken in Handling and Storing, Etc.	:	TRANSPORTATION AND STORAGE MUST BE IN ACCORDANCE WITH FEDERAL AND STATE REGULATIONS
Other Precautions	:	REFER TO MANUFACTURER'S INSTRUCTIONS AND WARNINGS SUPPLIED WITH PRODUCT.

Data Sheet Prepared By: E.L. STEARNS
Last Data Sheet Revision:

TETRYL

MATERIAL SAFETY DATA SHEET

Safechem No.: 903
Serial No.:

TETRYL

EMERGENCY TELEPHONES:
CHEMTREC: 800-424-9300
MANUFACTURER: Vendor phone # not noted
COMPANY RESP.: Emergency phone not noted
MSDS PREPARATION DATE:

FIRE HAZARDS		scale
HEALTH	2	0=not ent
FLAMMABILITY	4	*1=slight
REACTIVITY	4	*2=moder.
		*3=high
*) NFPA		*4=extreme
		5=unknown
		6=no impact

SECTION I: IDENTITY

SYNONYMS & TRADE NAMES [Family]: #)Trade names
NITRAMINE, PYRENITE, TETRALITE, 2,4,6-TRINITROPHENYLMETHYLNITRAMINE, N-2,4,6-TETRANITRO-N-METHYLANILINE, TRINITROPHENYLMETHYLNITRAMINE, [Organic nitro compound]

FORMULA: C7-H5-N5-O8
HAZARD CLASS: Class A Explosives

MOL. WEIGHT: 287.15
EPA #: N/E
CAS #: 479-45-8
NIOSH #: BY6300000
DOT/UN/NA #: 208
PART #: N/E

MANUF. NAME : Vendor name not noted
ADDRESS : Vendor address not noted
Vendor city, state, zip not noted
UN CLASS :

SECTION II: HAZARDOUS INGREDIENTS

This is a single-component chemical

SECTION III: PHYSICAL & CHEMICAL CHARACTERISTICS

BOILING POINT (760mmHg):	N/E	SPEC.GRAVITY(@ 68F):	1.57
VAPOR PRESSURE(mmHg) :	N/E	MELTING POINT (F):	~266
VAPOR DENSITY (air=1):	N/E	EVAPORATION RATE(BuAc=1):	N/E
PERCENT VOLATILE BY VOLUME:	N/E	VISCOSITY:	N/E
		pH-VALUE:	N/E
SOLUB.VALUE(g/100gH2O,68F):	N/E	CONCENTRATION (%/MOL):	N/E

SOLUBILITY: insoluble in water, soluble in organic solvents (most)
APPEARANCE: solid
COLOR : yellow
ODOR : N/E

SECTION IV: FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (F): N/E
FP METHOD : N/E
AUTO IGNITION TEMP.(F): 356
FLAMMABLE LIMITS: -lower %:
-upper %:

NFPA FLAMMABILITY RATING: Extremely flammable (4)
OSHA FLAMMABILITY CLASS : N/E

FIRE AND EXPLOSION HAZARD DATA (continued ...)

EXTINGUISHING MEDIA: water, foam, carbon dioxide (CO2), dry chemicals, sand, dolomite etc.

SPECIAL FIRE FIGHTING PROCEDURES

No specific fire fighting procedures noted.

EVACUATION PROCEDURES

No specific evacuation procedures noted.

NIOSH RESPIRATOR RECOMMENDATION

No specific recommendation made, but respiratory protection may still be required under exceptional circumstances when excessive air contamination exists.

UNUSUAL FIRE & EXPLOSION HAZARDS

May explode in a fire. May ignite other combustible materials. May react violently with oxidizing agents. May explode when heated, exposed to flames or sparks, or when rubbed.

SECTION V: REACTIVITY DATA & PHYSICAL HAZARDS

STABILITY:	Unknown
CONDITIONS TO AVOID:	Avoid heat, sparks, flames, shocks and physical damage, air and oxidizers, light
REACTIVITY INDEX:	Explosive (4)
HAZARDOUS DECOMPOSITION OR BYPRODUCTS:	Very toxic gases/vapors/fumes of carbon monoxide (CO), nitrous gases (NOx)
HAZARDOUS POLYMERIZATION:	N/E
CONDITIONS TO AVOID:	N/E
WATER REACTIVE?:	No
AIR REACTIVE? :	No

INCOMPATIBLE SPECIFIC CHEMICALS:

INCOMPATIBLE CLASSES OF CHEMICALS: Strong oxidizing agents

INCOMPATIBLE CONDITIONS:

SECTION VI: HEALTH HAZARD INFORMATION

ROUTES OF ENTRY: No route of entry noted

TARGET ORGANS : blood, central nervous system, eyes, kidneys, liver, respiratory system, lungs, skin

TOXIC DOSE (LD 50): N/E

TOXICITY INDEX : Highly toxic (4)

PERMISSIBLE EXPOSURE LIMITS:

FED-OSHA PEL:	0.1mg/m3(s)	
ACGIH TWA:	1.5mg/m3	CARCINOGENICITY:
ACGIH STEL:	No std.	NTP? NO

HEALTH HAZARD INFORMATION (continued ...)

NIOSH PEL: No std. IARC? NO
NIOSH IDLH: No std. OSHA? NO
CAL-OSHA PEL: 1.5mg/m3(s)

TOXICOLOGICAL INFORMATION: None entered

HEALTH WARNINGS

Dust from this chemical can be hazardous when inhaled and/or touched. This chemical may cause skin/eye irritation and burns (corrosive effect). Hepatotoxin. Bone marrow depressant.

ACUTE & CHRONIC HEALTH HAZARDS

Repeated exposure may cause chronic eye irritation, acute eczematous dermatitis, contact type (erythema, edema, papules, vesicles, bullae, crusts, desquamation). Swallowing concentrated chemical may cause severe internal injury, liver and/or kidney damage

SIGNS AND SYMPTOMS OF EXPOSURE

Extreme irritation of eyes and mucous membranes, including burning and tearing. Irritation of nose due to vapor or dust contact, severe skin irritation, cyanosis (blue tissue condition: nails, lips, and/or skin), purpura (spontaneous extravasation of blood from the skin capillaries), yellow skin stains

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE

Skin disorders and allergies. Liver and/or kidney problems

EMERGENCY AND FIRST AID PROCEDURES

EYE CONTACT: Promptly wash eyes with lots of water while lifting the eye lids. Get medical attention if any discomfort continues.
SKIN CONTACT: Remove victim from source of contamination. Promptly wash contaminated skin w/soap or mild detergent and water. Promptly remove clothing if soaked through and wash as above. Get medical attention promptly if symptoms occur after washing.
INHALATION: Move the exposed person to fresh air at once. Perform artificial respiration if breathing has stopped. Keep the affected person warm and at rest. Get prompt medical attention.
INGESTION: NEVER MAKE AN UNCONSCIOUS PERSON VOMIT OR DRINK FLUIDS! Get medical attention.

SECTION VII: PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Try to reclaim material, but DON'T sweep or burn w/o supervision by explosives expert.

WASTE DISPOSAL

Recover and reclaim or recycle, if practical.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Flammable/combustible: Keep away from oxidizers, heat and flames.
Protect from light, incl. direct sun rays.
Explosive storage

OTHER PRECAUTIONS

Avoid spilling, skin and eye contact. Ventilate well, avoid breathing vapors or dust. Use approved respirator if air contamination is above accepted level. Wear full protective clothing for prolonged exposure

PRECAUTIONS FOR SAFE HANDLING AND USE (continued ...)

and/or high conc.

SECTION VIII: PROTECTION AND CONTROL MEASURES

RESPIRATORY PROTECTION (required above 0.1mg/m3(s))
No specific recommendation made, but respiratory protection may still be required under exceptional circumstances when excessive air contamination exists.

PROTECTIVE GLOVES: No specific hand protection noted. For prolonged or repeated skin contact use suitable protective gloves.

EYE PROTECTION: Wear chemical safety goggles where eye exposure is reasonably probable.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT: No specific protective equipment noted, but may be required anyway.

HYGIENIC WORK PRACTICES: No specific hygiene procedures noted, but good personal hygiene practices are always advisable, especially when working with chemicals.

VENTILATION REQUIREMENTS: No specific ventilation requirements noted, but forced ventilation may still be required if air contamination exceeds acceptable level.

SECTION IX: ADDITIONAL INFORMATION

ENVIRONMENTAL LISTINGS
CERCLA (EPA Superfund)-Comprehensive Environm.Response,Comp.Liability Act. Hazardous waste (Calif.Adm.Code-T 22). Clean Water Act,S.304 (Priority Toxic Pollutants EPA)

Listed data compared to manufacturer's MSDS? NO
NOTE: Use with caution! Data may not reflect manufacturer's recommendations.
Verified and approved for use by: No name noted on
Revised by: No name noted on

End of MSDS

2,4,6 TRINITROTOLUENE

MATERIAL SAFETY DATA SHEET

Safechem No.: 938
Serial No.:

2,4,6-TRINITROTOLUENE

EMERGENCY TELEPHONES:
CHEMTREC: 800-424-9300
MANUFACTURER: Vendor phone # not noted
COMPANY RESP.: Emergency phone not noted
MSDS PREPARATION DATE:

FIRE HAZARDS		scale
HEALTH	2	0=not ent
FLAMMABILITY	4	*1=slight
REACTIVITY	4	*2=moder.
		*3=high
*) NFPA		*4=extreme
		5=unknown
		6=no impact

SECTION I: IDENTITY

SYNONYMS & TRADE NAMES [Family]: #)Trade names
sym-TRINITROTOLUOL, TNT, TOLIT#, TRILIT#, TRINITROTOLUENE, TRINITROTOLUOL, TROTYL#, METHYLTRINITROBENZENE, sym-TRINITROTOLUENE, [Organic nitro compounds]

FORMULA: C7-H5-N3-O6
HAZARD CLASS: Class A Explosives

MANUF. NAME : Vendor name not noted
ADDRESS : Vendor address not noted
Vendor city, state, zip not noted
UN CLASS :

MOL. WEIGHT: 227.13
EPA #: N/E
CAS #: 118-96-7
NIOSH #: XU 175000
DOT/UN/NA #: 1356
PART #: N/E

SECTION II: HAZARDOUS INGREDIENTS

This is a single-component chemical

SECTION III: PHYSICAL & CHEMICAL CHARACTERISTICS

BOILING POINT (760mmHg):	N/E	SPEC.GRAVITY(@ 68F):	1.654
VAPOR PRESSURE(mmHg) :	N/E	MELTING POINT (F):	176
VAPOR DENSITY (air=1):	N/E	EVAPORATION RATE(BuAc=1):	N/E
PERCENT VOLATILE BY VOLUME:	N/E	VISCOSITY:	N/E
		pH-VALUE:	N/E
SOLUB.VALUE(g/100gH2O,68F):	N/E	CONCENTRATION (%/MOL):	N/E

SOLUBILITY: slightly soluble in water, soluble in acetone, benzene
APPEARANCE: solid, crystals or crystalline
COLOR : yellow
ODOR : N/E

SECTION IV: FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (F): N/E
FP METHOD : N/E
AUTO IGNITION TEMP.(F): N/E
FLAMMABLE LIMITS: -lower %:
-upper %:

NFPA FLAMMABILITY RATING: Extremely flammable (4)
OSHA FLAMMABILITY CLASS : N/E

FIRE AND EXPLOSION HAZARD DATA (continued ...)

EXTINGUISHING MEDIA: foam, carbon dioxide (CO2), dry chemicals, sand, dolomite etc.

SPECIAL FIRE FIGHTING PROCEDURES

Keep run-off water out of sewers and water sources. Dike for water control. For massive fire in cargo area: use unmanned hose holder or monitor nozzles, if possible. If not: withdraw and let fire burn out. If water pollution occurs, notify appropriate authorities. Do not move cargo or vehicle if cargo has been exposed to heat.

EVACUATION PROCEDURES

Keep unnecessary people away,isolate hazard area and deny entry. Stay upwind and keep out of low areas.

NIOSH RESPIRATOR RECOMMENDATION

DOT Recommendation: Wear positive pressure breathing apparatus and special protective clothing.

UNUSUAL FIRE & EXPLOSION HAZARDS

Extremely flammable. May develop highly toxic or corrosive fumes if heated. Vapor explosion and poison hazard indoors, outdoors and in sewers.

SECTION V: REACTIVITY DATA & PHYSICAL HAZARDS

STABILITY:	Unknown
CONDITIONS TO AVOID:	Avoid heat, sparks, flames, long storage & large quantities, shocks and physical damage, contact with combustibles
REACTIVITY INDEX:	Explosive (4)

HAZARDOUS DECOMPOSITION OR BYPRODUCTS: N/E

HAZARDOUS POLYMERIZATION:	N/E
CONDITIONS TO AVOID:	N/E
WATER REACTIVE?:	No
AIR REACTIVE? :	No

INCOMPATIBLE SPECIFIC CHEMICALS:
SODIUM CARBONATE

INCOMPATIBLE CLASSES OF CHEMICALS: Strong oxidizing agents. Strong reducing agents. Flammable/comb. material

INCOMPATIBLE CONDITIONS:

SECTION VI: HEALTH HAZARD INFORMATION

ROUTES OF ENTRY: inhalation, skin absorption, ingestion, skin and/or eye contact

TARGET ORGANS : blood, central nervous system, eyes, heart & cardiovascular system, kidneys, liver, respiratory system, lungs, skin

HEALTH HAZARD INFORMATION (continued ...)

TOXIC DOSE (LD 50): 795mg/kg (oral rat)
TOXICITY INDEX : Highly toxic (4)
PERMISSIBLE EXPOSURE LIMITS:

FED-OSHA PEL:	0.5mg/m3(s)		
ACGIH TWA:	0.5mg/m3(s)	CARCINOGENICITY:	
ACGIH STEL:	No std.	NTP?	NO
NIOSH PEL:	No std.	IARC?	NO
NIOSH IDLH:	No std.	OSHA?	NO
CAL-OSHA PEL:	0.5mg/m3(s)		

TOXICOLOGICAL INFORMATION: None entered

HEALTH WARNINGS

Gas or vapor is harmful on prolonged exposure or in high concentrations. Dust from this chemical can be hazardous when inhaled and/or touched. This chemical may cause skin/eye irritation and burns (corrosive effect). Toxic through skin absorption (percutaneous). Neurotoxin. Hepatotoxin. Recognized allergen. Bone marrow depressant.

ACUTE & CHRONIC HEALTH HAZARDS

Repeated exposure may cause chronic eye irritation. May cause chemical eye burns, anemia, acute eczematous dermatitis, contact type (erythema, edema, papules, vesicles, bullae, crusts, desquamation). Swallowing concentrated chemical may cause severe internal injury, liver and/or kidney damage

SIGNS AND SYMPTOMS OF EXPOSURE

Extreme irritation of eyes and mucous membranes, including burning and tearing. Irritation of nose due to vapor or dust contact, severe skin irritation, cyanosis (blue tissue condition: nails, lips, and/or skin), purpura (spontaneous extravasation of blood from the skin capillaries), peripheral neuropathy, headache

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE

Skin disorders and allergies. Liver and/or kidney problems

EMERGENCY AND FIRST AID PROCEDURES

EYE CONTACT: Promptly wash eyes with lots of water while lifting the eye lids. Get medical attention immediately. Continue to rinse.
SKIN CONTACT: Remove victim from source of contamination. Promptly flush contaminated skin w/water. Promptly remove clothing if soaked through and flush the skin with water.
INHALATION: Move the exposed person to fresh air at once.
INGESTION: NEVER MAKE AN UNCONSCIOUS PERSON VOMIT OR DRINK FLUIDS! Get medical attention.

SECTION VII: PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Try to reclaim material, but DON'T sweep or burn w/o supervision by explosives expert. Extinguish all ignition sources. Avoid sparks, flames, heat, smoking. Ventilate! Flush area with flooding amounts of water.

WASTE DISPOSAL

Dilute w/organic solvent and incinerate using effluent gas cleaner.

PRECAUTIONS FOR SAFE HANDLING AND USE (continued ...)

Dike far ahead of spill for later disposal. Confirm disposal procedures with environmental engineer and local regulations.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Flammable/combustible: Keep away from oxidizers, heat and flames. Oxidizing material: Keep away from flammable and combustible materials. May attack some plastics, rubber and coatings. Keep in cool, dry, ventilated storage and closed containers. Ground container and transfer equipment to eliminate static electricity sparks. Store isolated from reducing agents.
Explosive storage

OTHER PRECAUTIONS

Keep away from heat, sparks and open flame. Avoid spilling, skin and eye contact. Ventilate well, avoid breathing vapors or dust. Use approved respirator if air contamination is above accepted level. Wear full protective clothing for prolonged exposure and/or high conc.

SECTION VIII: PROTECTION AND CONTROL MEASURES

RESPIRATORY PROTECTION (required above 0.5mg/m3(s))

No specific recommendation made, but respiratory protection may still be required under exceptional circumstances when excessive air contamination exists.

PROTECTIVE GLOVES: No specific hand protection noted. For prolonged or repeated skin contact use suitable protective gloves.

EYE PROTECTION: Wear chemical safety goggles where eye exposure is reasonably probable.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT: Use engineering controls to reduce air contamination to permissible levels.

HYGIENIC WORK PRACTICES: Promptly remove any clothing that becomes wet or contaminated. Contaminated clothing to be placed in closed container until disposal or decontamination. Warn cleaning personnel of chemical's hazardous properties.

VENTILATION REQUIREMENTS: No specific ventilation requirements noted, but forced ventilation may still be required if air contamination exceeds acceptable level.

SECTION IX: ADDITIONAL INFORMATION

ENVIRONMENTAL LISTINGS

DOT Hazardous Mat.Transp.Act(49 CFR)

Listed data compared to manufacturer's MSDS? NO

NOTE: Use with caution! Data may not reflect manufacturer's recommendations.

Verified and approved for use by: No name noted on

Revised by: No name noted on

End of MSDS

Appendix B
Procedures

LISTING OF EXISTING STANDARD OPERATING PROCEDURES

	Number	Title
1.	WYLE SOP 518–200–011D	Demolition Procedures (Electric Firing System)
2.	WYLE SOP 518–200–012C with Addendum	Demolition Proceudres (Non–Electric Firing System
3.	WYLE SOP 518–200–018C	Explosive Ordnance Disposal Subsurface (Shallow) UXO Access Operations
4.	WYLE SOP 518–200–019C	Off–Site Destruction and Disposal Operations (Non–Wyle Ranges)
5.	WYLE SOP 518–200–020A	Marking and Logging Locations of UXOs
6.	WYLE SOP 518–200–022B	Magnetometer Operation
7.	WYLE SOP 518–200–024E	Explosives and UXO Transportation Procedures
8.	WYLE SOP 518–200–028A	Storage of Explosives
9.	WYLE SOP 518–200–200	Heavy Equipment Operation
10.	WYLE SOP 518–200–201A	Equipment and Personnel Decontamiantion Procedures
11.	WYLE SOP 518–200–206A	Dust and Emissions Control
12.	WYLE SOP 518–200–209	Thermite Burn Out of Ordnance
13.	WYLE SOP 518–7–97B	Emergency Spill Response
14.	WYLE WOG 200–1	Operating Guideline for Decontamination

DEMOLITION PROCEDURES (ELECTRIC FIRING SYSTEM)

STANDING OPERATING PROCEDURE	S.O.P. No. 518–200–011D
WYLE LABORATORIES	Page 1 of 7
SUBJECT: Demolition Procedures (Electric Firing Systems)	Effective Date 13 July 1994
ISSUED BY: Explosive Ordnance Disposal (EOD)	Deletes 518-200-011C
APPROVED BY:	Dated 23 May 1994

1.0 PURPOSE

1.1 To establish safety standards and procedures for demolition operations using electric firing systems.

2.0 REFERENCES

2.1 NAVSEA OP 5 Vol. 1, Ammunition and Explosives Ashore
2.2 NAVSEA SWO60 AA MMA 010, Demolition Materials
2.3 NAVSEA 3565, Hazards of Electromagnetic Radiation to Ordnance
2.4 FM 5 25, Explosives and Demolitions
2.5 TM 9 1300 214, Military Explosives
2.6 TM 9 1375 213 12, Demolition Materials
2.7 29 CFR 1926.900(k)(3)
2.8 29 CFR 1926.900(k)(4)

3.0 SAFETY PRECAUTIONS APPLICABLE TO ELECTRIC FIRING SYSTEMS

3.1 Do not use electric blasting caps or charges in the vicinity of:

1. Thunderstorms within five (5) miles of the detonation site

2. Static electricity

3. Transmitters of radio frequency energy. Location and power output of RF transmitters aboard the INEL will be requested from the MK–FIC RAE. Non-electric demolition procedures will be used if the RF energy distances preclude electric firing system procedures.

Minimum Safe Distances between
RF Transmitters and Electric Blasting Operations

	Minimum Safe Distances (feet)	
Transmitter Power (watts)	Commercial AM Broadcast Transmitters	HF Transmitters Other Than AM Broadcast
100	750	750
500	750	7,700
1,000	750	2,400
4,000	750	4,800
5,000	850	5,500
10,000	1,300	7,600
25,000	2,000	12,000
50,000	2,800	17,000
100,000	2,900	24,000
500,000	8,800	55,000

4. High voltage transmission lines

5. Wind speeds in excess of 25 mph

3.2 Leads twisted or shorted by a shunt provide safe handling and storage against magnetic or static electric fields. Point the explosive end of blasting caps away from the body when handling.

3.3 Blasting caps are sensitive to initiation by static discharge. Static discharge can and has occurred when the metal blasting cap case is brought in contact with personnel or material with a different charge potential than the lead wires. This different charge potential can be brought on by clothing, by the use of plastic sheeting and plastic foam, or by friction or rubbing action. Personnel will ground themselves prior to handling or breaking the shunt on blasting cap lead wires.

3.4 During extension of lead wires for hookup to electrical firing source, RF levels must not exceed those allowed for unsafe ordnance as defined in NAVSEA OP 3565, Hazards of Electromagnetic Radiation to Ordnance (HERO).

3.5 Lead wires of electric blasting caps or squibs shall not be connected to electrical sources until ready to fire.

3.6 Do not pull leg wires of electric caps.

3.7 Do not set up a firing circuit so that a strain on the leg wires or firing wires might pull the leg wires out of the electric cap.

3.8 Keep both ends of the firing line twisted together at all times except when testing or connecting the circuit.

3.9 The blasting caps shall be continuity tested prior to connecting the leg wires to the firing wires using a blasting galvanometer (not exceeding a potential difference of 0.9 volts) to test the cap for continuity. To test the blasting cap, uncoil the leg wires to their full length and place the blasting cap behind a suitable barricade or under a filled sandbag. Tester should have his back to the barricade. The safety shunt shall not be removed from the leg wires until just prior to testing for electrical continuity. After testing for continuity, reshunt the wires by twisting the ends together and leave them twisted until the cap is connected to the firing circuit.

3.10 In any multiple hookup always use electric caps of the same manufacturer.

3.11 Test firing circuit prior to hooking up the blasting machine.

3.12 After charge is fired, disconnect the ends of the firing wires from the blasting machine and twist together.

3.13 Before the firing leads are connected to the electrical source, it shall be ascertained by one person so designated to ensure that the airspace is clear and that all personnel are accounted for and safely sheltered, and that all equipment, such as motor vehicles, are a safe distance from the hazard area. The signal for demolition shall be given only by the person in charge of the demolition operation.

3.14 Do not operate FM communication radio within 30 meters of electric blasting caps.

4.0 EQUIPMENT NEEDED FOR ELECTRIC FIRING

1. Circuit tester (galvanometer)
2. Double conductor demolition cable or double conductor firing wire
3. Blasting machine
4. Knife
5. Electrical tape
6. Electric blasting caps

5.0 ELECTRIC FIRING PROCEDURES

5.1 To avoid misfires caused by poor electrical connections, one person who thoroughly understands the technique of connecting electrical firing circuits must be responsible for all wiring in a demolition circuit, and must see that all connections between leg wires, connecting wires, and firing wires are properly made; and must insure that all caps are included in the circuit.

5.2 Firing circuits shall be made so that no strain on the leg wires will pull the leg wires out of the blasting cap, thus causing a premature detonation or misfire. The leg wires or firing wire, or both, may be tied to the charge. The proper methods of electrical priming are as follows:

1. Placing Charges. Prepare and place all charges for the appropriate type or types of charges.

2. Laying out of Firing Wire. After locating a firing position a safe distance away from the charges, lay out the firing wire.

   a. Test the firing wire
   b. Twist the free ends of the firing wires together to prevent static electricity from building up in the firing wire

3. Testing the Blasting Caps. Test each blasting cap to be used in the firing circuit. After each cap has been tested, shunt the free ends of the leg wires together to prevent an electrical charge from building up in the cap lead wires.

4. Connecting the Circuit. If two or more electric caps are used, connect their lead wires into a common series or leapfrog series circuit.

CAUTION

At the firing position keep the free ends of the firing wires shunted by twisting them together until ready to connect the blasting machine.

a. Before two wires are spliced together, strip off approximately three inches of the insulation material from the end of each wire so that bare wire is exposed. Prior to splicing, ensure that all enamel and insulation are removed by cleaning in one direction, taking care not to break or weaken the wires.

WARNING

Do not pass electric blasting cap lead wires from one person to another without prior grounding of both persons.

CAUTION

The bare shunted wires of the firing wire shall be touched together to the shunted cap leg wires to eliminate any electrical difference in potential that may have accumulated before being spliced.

b. Types of electrical firing circuits:

Common Series Circuit. A common series circuit is used for connecting charges fired with blasting machines. To connect charges in series, connect one wire of the first cap with one wire from the second cap, connect the other wire of the second cap to one wire from the third cap, and so on until only one wire of the first cap and one wire of the last cap are free. Connect these two free wires to the two lead wires of the firing wire.

Leapfrog Series Circuit. The leapfrog series circuit may be used as an alternative to the common series circuit. A leapfrog circuit often is used to connect a long line of charges because it permits both leads of the firing line to be connected to the same end of the line of charges. Connecting wires are used when the distance between caps is so great that the 12-foot leads cannot be properly joined.

c. Splice the free ends of the cap lead wire(s) to the firing line.

CAUTION

Do not inert blasting cap into charge at this time.

5. Inserting Caps into Charges. Place the blasting caps into the explosive charges and fasten the caps securely to the charge.

6. Testing the Entire Circuit. Move to the safe position and test the entire circuit with the galvanometer. Twist the free ends of the firing wire together.

7. Exercising the Blasting Machine. Test operate the blasting machine by operating it several times with nothing connected to the terminals.

WARNING

Do not connect the blasting machine to the firing wires until all prefiring tests have been completed and until ready to fire the charge. Do not burn electric blasting caps.

8. If required, use blasting cap crimpers to make a hole in the charge.

9. Insert blasting cap into the charge fasten the çap securely into the charge. Do not force the blasting cap.

10. Connecting the Blasting Machine. Untwist the free ends of the firing wire and fasten them to the two posts of the blasting machine.

11. Fire-in-the-Hole. Just prior to the firing of the blasting machine, shout out the warning, "Fire-in-the-Hole."

12. Fire the blasting machine.

6.0 PREMATURE FIRING

6.1 An electric current strong enough to detonate electric blasting caps can be induced in a firing circuit by any one of many sources. Even blasting caps connected to shorted leg wires and shorted firing wires have been detonated prematurely. Therefore, electrically fired charges shall not be set up in the vicinity of thunderstorms (lightning), static electricity, and radio transmitters, stray currents, or galvanic action. Updates of local weather forecasts will be obtained by the Lead EOD Technician prior to detonation.

WARNING

Do not conduct blasting or demolition operations during an electrical, dust, sand, or snow storm of a severity great enough to produce atmosphere static electrical charges, or when such a storm is near by (approximately 5 miles).

6.2 If lightning strikes an electric firing circuit or explosive component, a denotation will result, no matter what precautions are taken. A detonation probably will result even from a near miss. Electrical charges large enough to detonate caps have been induced in firing circuits by lightning several miles away. This danger obviously is greater if there is a conductor, such as a transmission line, fence or stream, between the storm and the demolition site. Therefore, charges shall not be primed or connected for electrical firing during the approach or presence of a thunderstorm.

WARNING

Do not handle, use, or remain near explosives during the approach or progress of an electrical storm.

6.3 Many electric blasting caps have detonated because they grounded static electricity in the air or in materials or personnel brought in contact with the cap. Static electricity is produced by a great variety of causes; among them, dust storms, which have caused a large number of detonations; and escaping steam, known to have charged the air and detonated the caps. Enough static electricity to detonate caps can also be generated by such sources as moving belts and revolving automobile tires, separating materials, and plastic tarps.

WARNING

Do not work with electric blasting caps or other electroexplosive devices while wearing static-electricity-producing clothing (nylon, silk, synthetic hair, etc).

CAUTION

Static electricity is an increased hazard when operating in an extremely cold climate. Care must be taken to reduce the possibility of premature detonation of electric blasting caps and other electro-explosive devices.

6.4 Galvanic action, though very rare, has caused premature detonations by a battery effect developed by equipment used near electric blasting caps.

7.0 GENERAL MISFIRE PROCEDURES

7.1 If blasting cap(s) fail to fire:

1. Check connections to the blasting machine
2. Try functioning the machine again. After three unsuccessful attempts, recheck circuit with galvanometer
3. If circuit checks good and another blasting machine is available, attempt to refire the charge
4. If cap(s) fail again:

WARNING

Wait 30 minutes before investigating an electric misfire.

5. Ensure blasting wire is shunted prior to investigating an electric misfire
6. Disconnect misfired electric cap(s) lead wires from the firing line and shunt lead wires
7. Follow steps in Section 5.0. Destroy misfired blasting cap by detonation

8.0 MISFIRE ON THE IDAHO NATIONAL ENGINEERING LABORATORY

8.1 If blasting cap(s) fail to fire, the procedure in the INEL Project Blasting Plan and DOE–ID 0550 will be folowed.

DEMOLITION PROCEDURES
(NON-ELECTRIC FIRING SYSTEM)

	STANDING OPERATING PROCEDURE	S.O.P. No. 518-200-012C
WYLE LABORATORIES		Page 1 of 5
SUBJECT:	Demolition Procedures (Non-Electric Firing Systems)	Effective Date 23 May 1994
ISSUED BY:	Explosive Ordnance Disposal (EOD)	Deletes 518-200-012B
APPROVED BY:		Dated 22 Jan 1993

1.0 PURPOSE

To establish safety standards and procedures for EOD personnel engaged in demolition operations using non–electric firing systems. A non–electric firing system is one in which an explosive charge is prepared for detonation using a non–electric blasting cap. A non–electric firing system shall not be used if time and circumstances permit the use of an electric firing system. The non–electric firing system does not provide positive control over the time of detonation.

2.0 REFERENCES

2.1 Army TM 60A–1–1–31, EOD Disposal Procedures
2.2 Army TM 9–1375–213–12, Demolition Materials
2.3 NAVSEA OP 5 Vol. 1, Ammunition and Explosives Ashore
2.4 NAVSEA 3565, Hazards of Electromagnetic Radiation to Ordnance (EMR)
2.5 ID Appendix 0500, Subpart III Explosives, Standard Operational Safety Requirements
2.6 DOE Explosives Safety Manual

3.0 SAFETY PRECAUTIONS

3.1 Review EMR Hazards and Precautions.

3.2 Always carry blasting caps in approved containers.

3.3 Do not use UXO for demolition purposes.

3.4 Always point explosive end of blasting caps away from the body during handling.

3.5 Use only No. 8 or equivalent blasting caps.

3.6 Do not bury blasting caps.

3.7 Do not force time fuze into a blasting cap.

3.8 Use only an approved crimping device for crimping a blasting cap to the time fuze. Crimping of blasting caps will not be accomplished at a distance less than 25 feet from explosives.

3.9 Do not allow time fuze to coil up and contact itself after being ignited.

3.10 Wait one hour after anticipated time of detonation before approaching a misfire.

3.11 Only EOD qualified personnel will be involved in the detonation of UXO and explosives.

4.0 NON–ELECTRIC FIRING SYSTEM PROCEDURES

NOTE

A non–electric (igniter, fuze and non–electric blasting cap) firing system is designed to enable personnel to initiate the detonation of a demolition charge. The system may be used to fire either one charge or several charges in succession with the use of detonating cord to connect the charges.

4.1 Cut and discard a six–inch length from the free end of the time fuze to prevent an inaccurate burning time caused by the exposed powder absorbing moisture from the air. Then cut off at least a six–foot length of time fuze to check the burning rate. A sample shorter than six feet can lead to an inaccurate estimate of the burning rate of the fuze.

NOTE

The burning rate of blasting time fuze varies between 30 to 50 seconds per foot for safety fuze (35–45 seconds per foot for M700 Time Blasting Fuze). The burning rate of a fuze can be increased or decreased by the way it is handled and the conditions under which it is burned. A fuze burns faster when it is confined by tamping or some other means of confinement and more slowly when it is subject to reduced external pressure. Other factors being equal, a fuze will burn about two seconds per foot slower at an altitude of 5000 feet than at sea level. Although the burning rate may be affected slightly by temperature, it should not have a burning rate less than 30 seconds per foot even at temperatures as low as –50 degrees F.

4.2 Cut the fuze long enough but never less than six feet to allow the person igniting the fuze to reach a safe distance by walking at a normal pace before the detonation of the charge. Do not use less than five minutes of fuze.

NOTE

The fuze should be warm and flexible when it is uncoiled. A cold, brittle fuze often will split or break. In cold weather, the fuze should be warmed in a heated room and carried under the outer clothing. The fuze should be uncoiled gently and not be twisted, kinked, or sharply bent, since these actions can break the powder train and cause a misfire. The fuze should not be mashed, loss of powder or looseness of the powder train can cause a fuze to burn at an accelerated rate. If fuze is used in cold weather and cannot be warmed, it shall be used in a coil form in the configuration of a stretched coil spring.

4.3 Attach the fuze lighter. Insert one end of the safety fuze to the fuze lighter until it rests against the primer. Ensure the fit sufficiently tight to hold the fuze in place. If primer adapters are to be used, insert the free end of the safety fuze through the unthreaded end of the adapter.

4.4 Take one blasting cap from the box. Non–electric caps shall be removed by tilting the box into the palm of one hand until one cap begins to slide out. Withdraw this cap carefully.

WARNING

Do not try to pry the cap out with a sharp, pointed object or stick of wood. This can easily cause the detonation of the cap.

Do not insert anything into a cap to remove dirt or foreign material. Do not tap against, or with, a hard object, or blow into the cap.

Do not force safety fuse into a blasting cap. If it does not enter easily, replace the cap or the fuse.

4.5 Inspect the cap by looking into the open end. If any foreign matter is present, gently shake it out. If foreign matter does not come out, reject the cap.

WARNING

When inserting fuze into the cap, do not force or twist the fuze or otherwise cause friction between the fuze and the explosive in the cap. This could cause cap detonation.

4.6 Hold the safety fuze vertically with the square cut end up and then slip the blasting cap gently down over it so that the flash charge of the cap is in contact with the end of the fuze. If not in contact, it may misfire. After the blasting cap has been seated, hold the cap firmly against the fuze.

4.7 Using approved crimping device, crimp the cap at a point 1/8 to 1/4 inch from the open end. Complete the crimp while holding the cap pointed away from the body and head. Remove the crimpers from the cap.

4.8 Use blasting cap crimpers to make a hole in the charge and insert cap into charge. Do not force cap into charge.

4.9 Lay out the safety fuze in a straight line and secure it at each end.

4.10 Check the area to ensure that it is clear of all non essential and unauthorized personnel. Check to ensure that the airspace is clear of aircraft.

4.11 If the area is clear, in a loud voice shout, "Fire In The Hole" in succession three times.

4.12 Light the fuze, verify that the time fuze is burning, and proceed to the safe area.

CAUTION

Do not hold an explosive charge in the hand while lighting the safety fuze.

NOTE

When lighting a time fuze, ensure that other charges, caps, and fuzes are at a safe distance and that the burning time fuze will not come into contact with them.

5.0 MISFIRE PROCEDURES

5.1 If blasting cap fails to fire **WAIT ONE HOUR** from time of expected detonation before investigating.

> **WARNING**
> Working on or near a misfire is the most hazardous of all blasting operations. A misfire cannot be immediately distinguished from a delay in function. Do not handle suspected misfires until after required waiting period has elapsed.

5.2 Prepare a new non–electric train as outlined in Section 4.

5.3 Proceed as per Section 4. Destroy misfired blasting cap by detonation.

6.0 POST DETONATION INSPECTION

6.1 Wait five minutes.

6.2 After mandatory waiting period has expired investigate detonation site for thorough and clean detonation.

7.0 EQUIPMENT REQUIRED FOR OPERATIONS

1. Special non–electric blasting cap
2. Blasting time fuze
3. Cap crimpers
4. Sharp knife
5. Tape insulating or cap sealant compound for waterproofing
6. Fuze igniter
7. Explosives

WYLE LABORATORIES	ADDENDUM TO STANDING OPERATING PROCEDURE 518-200-012C Demolition Procedures (Non-Eletric Firing Systems)	S.O.P. No. 518-200-012C Add.
		Page 1 of 1
		Effective Date 30 April 1993
ISSUED BY: Explosive Ordnance Disposal (EOD) APPROVED BY:		Deletes 518-200-012B Add. Dated 30 April 1993

1.0 PURPOSE

The purpose of this addendum is to address additional concerns at the INEL site beyond the normal scope of a Wyle Standing Operating Procedure.

2.0 REFERENCES

2.1 All references of SOP 518-200-012C apply.

3.0 APPLICABILITY

3.1 This contingency SOP is applicable to all Wyle employees and subcontractors involved in UXO disposal and remediation activities on the INEL site.

4.0 PROCEDURES

4.1 When a UXO is to be detonated, WCC must be notified in advance so that PTI helicopter overflight cannot occur. In addition, WCC will notify INEL Fire Department and any facilities adjacent to the detonation site.

EXPLOSIVE ORDNANCE DISPOSAL
SUBSURFACE (SHALLOW)
UXO ACCESS OPERATIONS

WYLE LABORATORIES	STANDING OPERATING PROCEDURE	S.O.P. No. 518–200–018C
		Page 1 of 4
SUBJECT:	Explosive Ordnance Disposal Subsurface (Shallow) UXO Access Operations	Effective Date 13 July 1994
ISSUED BY:	Explosive Ordnance Disposal (EOD)	Deletes 518–200–018B
APPROVED BY:		Dated 28 July 1993

1.0 PURPOSE

To provide safety standards and procedures for shallow depth (four feet) UXO excavation and recovery.

2.0 REFERENCES

2.1 US Army TM 60A–1–1–22, General EOD Safety Precautions
2.2 US Army TM 60A–1–1–5, Access and Recovery of Buried UXO
2.3 US Army TM 60A–1–1–4, Protection of Personnel and Property
2.4 Wyle SOP 518–200–019C

3.0 SAFETY

3.1 Observe all general ordnance and UXO safety precautions.

3.2 Be aware of camouflet hazard. Be alert for carbon monoxide poisoning.

3.3 Be careful not to strike UXO with excavating tools.

3.4 Keep excavated soil a minimum of two feet from the edge of the excavation site.

3.5 Keep tools and equipment away from excavation hole when not in use.

3.6 Ensure that there is a sufficient source of water immediately available should WP be encountered. If conditions are such that water is not available the WP should be left or placed back in the position found.

3.7 EOD operations will not be conducted within five (5) miles of an approaching thunderstorm.

3.8 EOD operations will not be conducted during constant wind speeds of 25 mph or more.

3.9 Keep the number of people near an EOD operation and the time of exposure for EOD personnel to a minimum reasonably achievable. No more than five people shall be potentially exposed during EOD activities where an accidental explosion is possible (e.g., UXO access, characterization, handling, and preparing and setting countercharges.)

3.10 Each EOD supervisor shall have successfully completed EOD training at the Naval Explosive Ordnance Disposal School and shall have at least 10 years in military EOD assignments, of which 5 years must have been in supervisory positions. All EOD technicians shall have successfully completed EOD training at the Naval Explosive Ordnance Disposal School.

WARNING

Be aware of camouflets. Camouflets can remain filled with poisonous gases under high pressure.

Be aware of ammonium nitrate explosives. Weapons loaded with ammonium nitrate explosives will produce ammonia gases when wet. Where aluminum is also present, in extremely wet conditions, an exothermic reaction producing hydrogen gas can occur. Gassing in this situation can be fatal and there may be a serious fire hazard.

Be aware of white phosphorus weapons. White phosphorus may remain dormant in the earth ready to ignite spontaneously when exposed to air. This could result in a white phosphorus fire. If the UXO also contains high explosives, prompt action may be necessary.

4.0 UXO ACCESS PROCEDURES

4.1 Check site weather forecasts before beginning operations. Monitor electrical storm proximity detector (Allsky) and wind speed indicator during operations.

4.2 Estimate the approximate size and orientation of the UXO. Estimate the depth by noting the change in signal tone of the magnetometer.

a. Calculate a minimum safe distance based on the most restrictive distance for fragmentation or blast overpressures. Add 20% to the NEW when determining the TNT equivalent. For cased UXO use: 500 times the cube root of TNT equivalent (lbs). For uncased UXO use: 300 times the cube root of the TNT equivalent.

b. Establish safe zone based on the minimum safe distance. Verify by measurement that an adequate safe zone is established. If structures or personnel are within the safe zone, verify that barriers (natural or manmade) are in place to protect personnel and structures from fragmentation, cratering, seismic loading, and air blast overpressures of 2.3 psi or greater.

c. Barricade and post all accesses (roads, trails, etc.) into the safe zone to prevent inadvertent intrusions. Barricades at the six remediation sites will be manned or within line of sight of EOD personnel as necessary to maintain the safe zone for EOD operations.

d. Inform INEL security helicopter operations of the intended EOD activity and safe air distances.

e. Maintain a visual survey of the safe zone throughout the EOD activity, and account for all EOD personnel and visitors.

f. If intrusion into the safe zone occurs:

1. Suspend EOD activities
2. Warn and remove the intruder
3. Reestablish a safe radius of operation

4.3 Establish the width and length of the area to be excavated.

4.4 Extend the width and length a minimum of 12 inches to ensure adequate space is available to perform recovery or disposal procedures once the UXO is uncovered.

4.5 Loosen the soil and remove any large rocks in the area.

4.6 Use shovel, trowel or gloved hands to remove soil during the digging process until the UXO is discovered.

WARNING

Do not strike or jar UXO. Do not move UXO unless specifically called for in the EOD procedures.

4.7 Once contact is made with the UXO, continue the digging process using a small garden trowel or gloved hands. Completely uncover the UXO and ensure adequate space is available to perform procedures.

4.8 Identify UXO, fuze and fuze condition.

NOTE

The Senior EOD Technician will verify identification of all UXO fuze and fuze condition.

a. Fully characterize all UXOs using applicable technical manuals, and if necessary, active EOD units and other technical EOD resources to identify the type, sensitivities, and hazards before handling, moving, or countercharging UXO.

b. Visually, and to the extent possible, physically, evaluate the condition of the UXO, in particular the type and condition of the fuze.

c. Establish the safe/arm status before handling the UXO. If the fuze condition is questionable, consider the fuze armed.

d. Handle UXO only when absolutely necessary.

e. Questionable UXOs shall be removed remotely, ensuring that nearby structures and personnel are protected by barriers (see para. 4.2).

f. The EOD supervisor and at least one other EOD technician shall verify that the UXO can be safely handled.

4.9 UXO shall be detonated in place unless the detonation may impact nearby facilities, structures, or personnel. If there are impacts, and if UXO has been determined to be safe to handle, and if transportation to the blast area is required, follow procedures outlined in the Hazardous Materials/Waste Transportation Plan, Blasting Plan and applicable SOPs. If the UXO cannot be safely handled, the UXO will be detonated in place using the controls and reviews in SOP 518–200–19B.

OFF SITE DESTRUCTION AND DISPOSAL OPERATIONS

WYLE LABORATORIES	**STANDING OPERATING PROCEDURE**	**S.O.P. No.** 518–200–019C
		Page 1 of 5
SUBJECT:	Off Site Destruction and Disposal Operations (Non Wyle Ranges)	**Effective Date** 18 April 1994
ISSUED BY:	Explosive Ordnance Disposal (EOD)	**Deletes** 518–200–19B
APPROVED BY:		**Dated** 28 July 1993

1.0 PURPOSE

To establish safety standards and operational procedures for the destruction and/or disposal of UXO, ammunition, ordnance items, explosives, components and associated hazardous materials at sites other than Wyle ranges.

2.0 REFERENCES

2.1 Army TM 60A–1–22, General EOD Safety Precautions
2.2 Army TM 60A–1–1–31 EOD Disposal Procedures
2.3 Army TM 9–1375–213–12 Demolition Materials
2.4 Army TM 60A–1–1–4 Protection of Personnel and Property
2.5 Air Force T.O. 11A–1–42 General Instruction for Disposal of Conventional Munitions
2.6 NAVSEA 3565 Hazards of Electromagnetic Radiation to Ordnance
2.7 NAVSEA OP 5 Vol 1 Ammunition and Explosives Ashore
2.8 ID Appendix 0550, Subpart III Explosives, Standard Operational Safety Requirements
2.9 DOE Explosives Safety Manual
2.10 Wyle SOP 518–200–011D
2.11 Wyle SOP 518–200–012C
2.12 Wyle SOP 518–200–018C

3.0 SAFETY

Safety is always of paramount importance. Therefore, personnel will observe all general and applicable special safety regulations and requirements contained in the references.

3.1 Only trained and qualified EOD personnel will be allowed to participate in destruction or disposal operations. Each EOD supervisor shall have successfully completed EOD training at the Naval Explosive Ordnance Disposal School and shall have at least 10 years in military EOD assignments, of which 5 years must have been in supervisory positions. All EOD technicians shall have successfully completed EOD training at the Naval Explosive Ordnance Disposal School.

3.2 Always review EMR hazards and precautions and electrical grounding procedures prior to destruction or disposal operations.

3.3 Carry blasting caps in approved containers.

3.4 Do not conduct disposal operations during the approach or progress of an electrical system within 5 miles or during periods when the constant wind speed is 25 mph or greater.

3.5 Do not use unserviceable explosives, or accessory equipment that is damaged.

3.6 Do not use UXO as demolition material.

3.8 Use only No. 8 or equivalent blasting caps.

3.9 Keep blasting caps in approved containers at least 25 feet from other explosives until they are needed for priming.

3.10 Prime only the required number of charges.

3.11 Disposal operations shall be conducted only during daylight hours.

3.12 Test electric blasting caps for continuity at least 25 feet from other explosives.

3.13 Disposal operations will be conducted under the supervision of the Senior EOD Technician.

3.14 The number of people allowed near an EOD operation and the time of exposure for EOD personnel shall be kept as low as reasonably achievable. No more than five people shall be potentially exposed during EOD activities where an accidental explosion is possible (e.g., UXO characterization, preparing and setting countercharges, etc.).

3.15 If loose explosives are to be disposed of by detonation, only one kind of explosive will be detonated if any one given shot.

3.16 Do not bury blasting caps.

3.17 White phosphorous ordnance will not be detonated into the ground.

3.18 Personnel will remain in the safe area after detonation until the Senior EOD Technician determines the area to be safe.

3.19 At no time will the net explosive limit of any one shot exceed the established explosive range limits.

3.20 In the event of a range fire, EOD personnel shall immediately evacuate the area and notify the EG&G Idaho Fire Department. EOD personnel shall not attempt to fight range fires. Wyle EOD personnel will advise the EG&G Fire Department whether or not UXOs are present or suspected to be present and that they do not fight fires when UXOs are present or suspected.

4.0 OPERATIONAL PROCEDURES

4.1 The selected disposal site shall be as far removed from facilities as possible with suitable access roads, free of combustible material and other debris. Disposal site shall be provided by the customer.

NOTE

Communications will be maintained with the command post at all times while disposal operations are in progress. Operations will cease whenever a breakdown of communications occurs.

4.2 All customer safety and range limitations will be observed in the handling, storing and transporting detonations and use of explosives.

4.3 Request authorization to transport UXO to disposal area if UXO is not going to be destroyed in place.

4.4 Request authorization to destroy UXO.

NOTE

If detonation of UXO is in close proximity to buildings or facilities, prepare the area as per EOD Reference TM 60A–1–1–4 prior to detonation.

4.5 Post warning signs, roadblocks, and post red bravo flag.

a. Notify the following of location and safe distances for impending detonations:

1. EG&G Idaho Fire Department
2. INEL Security Helicopter Operations
3. Test Reactor Area
4. Idaho Chemical Processing Plant
5. Warning Communication Center
6. Medical Facility

b. Ensure Blasting Permit is in place.

c. Check site weather forecasts. Monitor electrical storm proximity detector (Allsky) and wind speed indicator.

d. If conducting EOD operations in the blast site, ensure it is prepared in accordance with the Blasting Plan.

e. When conducting EOD operations:

1. Ensure a safe zone is determined, established and maintained IAW SOP 518–200–18B.

2. Ensure protective barriers are adequate. Prepare and submit documentation to DOE–ID for approval. Do not proceed without approval.

3. Notify potentially impacted facilities or areas in advance, and evacuate if necessary.

4.6 Search disposal range for unauthorized personnel prior to starting disposal operations.

4.7 Verify that the airspace is clear of all aircraft.

4.8 All vegetation such as dry grass, leaves, and other combustible material shall be removed within a radius of approximately 200 feet from the detonation site, or wet down the 200 foot area.

4.9 An accurate inventory will be taken of all UXO and explosives. If storage in portable magazines is required:

1. Locate the magazine site at least 1250 ft from the detonation site.

2. Munitions, demolition materials, and blasting caps shall be stored in individual magazines separated by at least 25 ft.

3. Ensure dry grass and vegetation is cleared in a 50 ft radius from each magazine.

4. Request DOE–ID approval of the storage location.

4.10 Disposal by detonation is accomplished by various methods depending on characteristics of the ordnance item being disposed of. Therefore, the appropriate referenced TM/T.O. will be used for preparing the ordnance items for destruction.

4.11 Conduct detonation operations in accordance with appropriate Wyle Demolition Procedure S.O.P. Electric SOP 518–200–011D, Non Electric SOP 518–200–012C.

a. Before each initiation of explosives, the EOD supervisor will:

1. Account for all EOD personnel and visitors.
2. Visually survey the area within the safe zone.
3. Give audible warnings immediately before initiating explosives.

b. If intrusion into the safe zone occurs, the EOD supervisor will:

1. Suspend disposal activities
2. Place initiation equipment in a safe mode
3. Warn and remove the intruder
4. Reestablish a safe radius of operation

4.12 After detonation all personnel will wait in the safe area for five minutes.

4.13 Perform post detonation inspection. Check for complete detonation. The Senior EOD Technician and one other individual will return to the site to inspect the area for hazards. The second EOD technician will remain back, but within sight of the Senior EOD Technician. The safety backup will be prepared to come to the aid of the Senior EOD Technician in an emergency.

4.14 After the area has been inspected by the Senior EOD Technician for any explosive hazards, and a determination has been made that the area is free of explosive hazards, a verbal all clear will be given by the Senior EOD Technician to personnel on site.

4.15 The Senior UXO Technician will notify the field office via FM radio that disposal operations have ceased and that the disposal site is safe and clear to enter.

4.16 Demobilize from site. Remove all barricades and signs.

4.17 Notify the customer.

5.0 ACCOUNTABILITY OF ORDNANCE DESTROYED

5.1 Accountability for unexploded ordnance recovered/destroyed is the responsibility of the Site Manager. The Senior EOD Technician is responsible for the maintenance of a record of the types of ordnance and amounts destroyed daily.

5.2 Demolition materials used will be logged daily and the amounts recorded by the Site Manager.

5.3 Total numbers of ordnance destroyed and their types will be maintained by the Site Manager and will include the amount of explosives used in their destruction. This information will be maintained by the Site Manager and provided as necessary to fulfill contract requirements.

MARKING AND LOGGING LOCATIONS OF UXO'S

STANDING OPERATING PROCEDURE	S.O.P. No. 518–200–020A
WYLE LABORATORIES SCIENTIFIC SERVICES & SYSTEMS GROUP	Page 1 of 5
SUBJECT: Marking and Logging Locations of UXO's	Effective Date 18 April 1994
ISSUED BY: Explosive Ordnance Disposal (EOD)	Deletes 518–200–020
APPROVED BY:	Dated 20 Oct 1992

1.0 PURPOSE

To provide procedures for marking and logging locations of UXO's.

2.0 REFERENCES

2.1 TM 60A–1–1–22, General EOD Safety Precautions
2.2 TM 60A–1–1–5, EODP for Access and Recovery of Buried UXO
2.3 TM 60A–1–1–36, EODP for Surface Range Clearance, General Information
2.4 EM 385–1–1, US Army Corps of Engineers Safety
2.5 NAVSEA OP 5 Vol 1, Ammunition and Explosives Ashore

3.0 SAFETY

3.1 Observe all ordnance and UXO safety precautions.

3.2 Ensure stakes, bicycle flags or other markers are placed at such a distance that they will not impact on the UXO if they should fall.

3.3 When installing markers, keep other marking materials a minimum of five feet from UXO.

3.4 Do not strike, move or jar UXO.

3.5 Do not drive a stake or marker into the ground directly over a suspected buried UXO.

4.0 UXO MARKING PROCEDURES

4.1 Various types of marking material may be used for marking UXO's. Acceptable marking material is shown in Table 4–1. Only one type of marker should be used for marking UXO's at a specific work site. Selection of the marker and marker color should be based on the terrain, vegetation and type of soil at the work site to ensure that the markers will be easily visible.

Table 4–1.

Type	Size
Wood (1)	1 in. x 2 in. x 5 ft.
Wood Lathing (1)	1/4 in. x 2 in. x 5 ft.
Bicycle Flags (2)	1/2 in. fiberglass rod x 5 ft.
Engineer Flags (2)	1/8 in. steel rod x 2 ft.

NOTES

1) Approximately 12 inches of the top stake will be painted in a color that is easily visible from a distance. The lower end of the stake will be wedge cut and the upper end square cut so that the stake may be pounded into the ground.

2) Various colors are available. Color chosen should be easily visible from a distance and resist fading and weathering.

4.2 When marking the location of surface UXO, offset the marker from the UXO so that if the marker should fall or be knocked over it will not contact the UXO (see Figure 4–1).

4.3 If the UXO is not easily visible from the marker a length of engineer tape will be secured from the marker to a point near the UXO (see Figure 4–1).

4.4 When marketing a suspected sub surface or buried UXO offset the marker from the UXO location. A length of engineer tape will be secured from the marker to a point near the buried UXO location (see Figure 4–2).

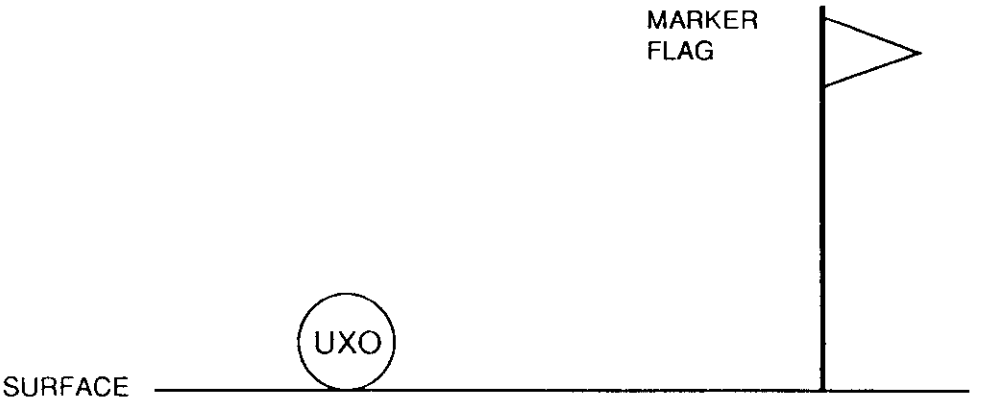


Figure 4–1. Surface UXO

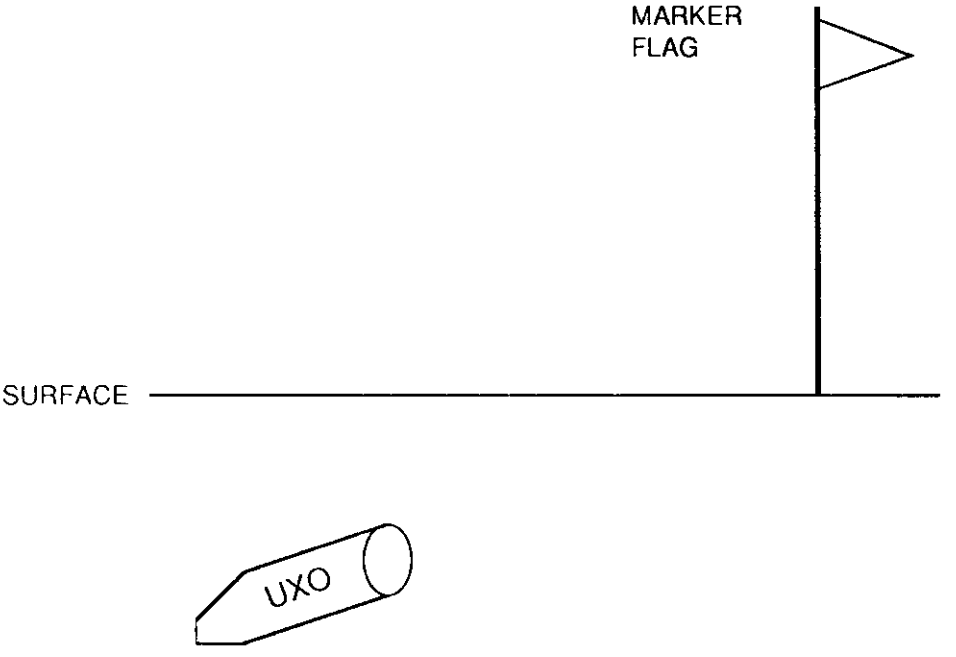


FIGURE 4–2. SUB SURFACE UXO

5.0 LOGGING OF UXO AND LOCATIONS

5.1 Log all discovered UXO into a field note book.

5.2 Location of UXO will be marked on the ORDNANCE LOCATION & TYPE form (see Figure 5–1) using grid coordinates.

5.3 UXO will be positively identified and logged into a field note book and on the ORDNANCE LOCATION & TYPE form (Figure 5–1).

5.4 UXO location and UXO identification will be verified by the Senior EOD Technician.

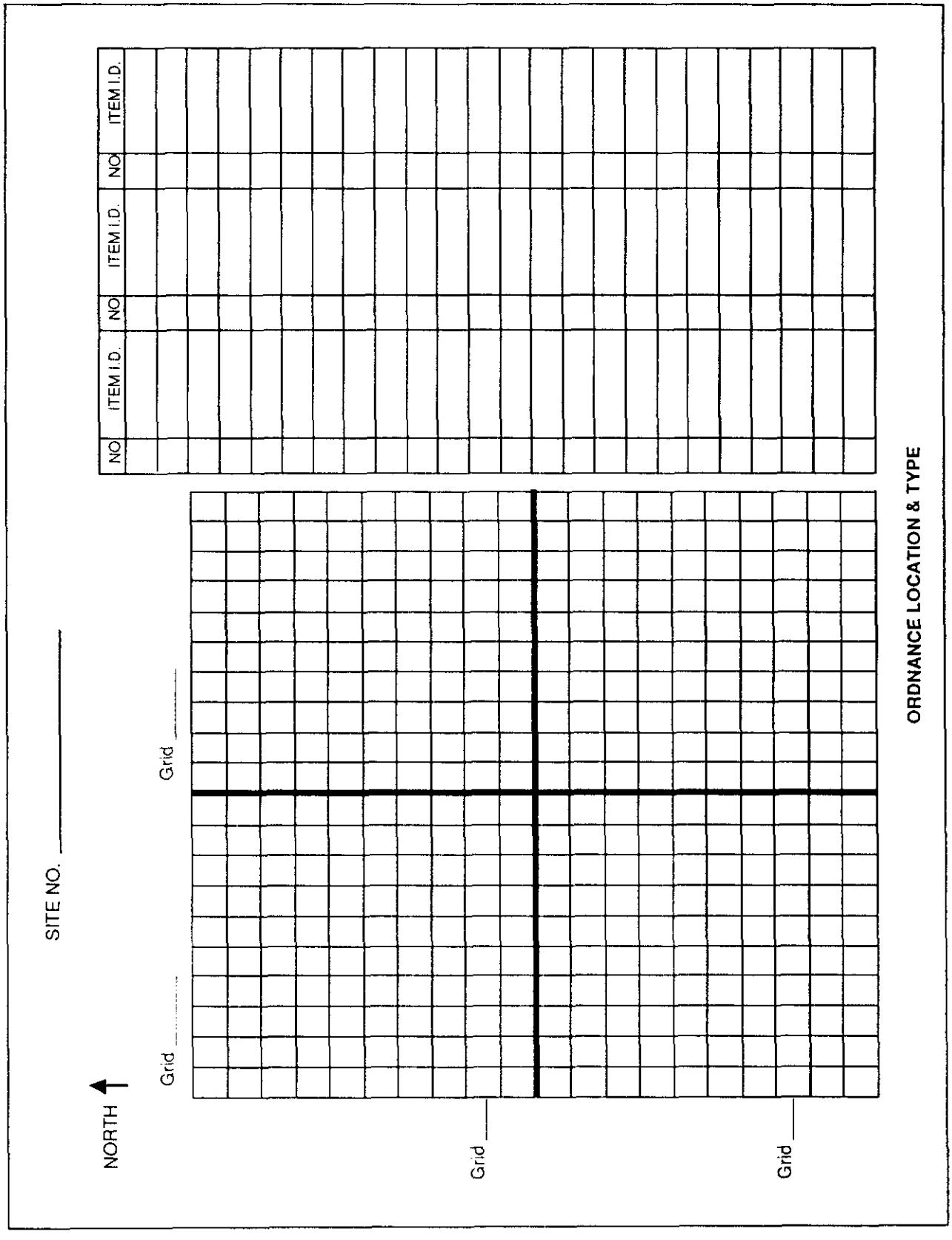


Figure 5–1. Ordnance Location & Type Form

MAGNETOMETER OPERATION

STANDING OPERATING PROCEDURE	SOP. NO. 518–200–022B
WYLE LABORATORIES	PAGE 1 of 4
SUBJECT: Magnetometer Operation	EFFECTIVE DATE 18 April 1994
ISSUED BY: Explosive Ordnance Disposal	DELETES 518–200–022A
APPROVED BY:	DATED 22 January 1993

1.0 PURPOSE

To provide standard operating and maintenance procedures for ordnance locators during UXO operations.

2.0 REFERENCES

Operators Manual	Schonstedt GA52C
Operators Manual	White's Eagle Spectrum II
Operators Manual	White's PI 3000
Operators Manual	White's TM 800
TM 60A–1–1–22	General EOD Safety Precautions

3.0 PRECAUTIONS

3.1 Do not use active signal detectors in areas where the possibility of battery powered influence fuzing exists.

3.2 Do not allow detector to come in contact with ordnance.

3.3 When operating the TM 800, GA52C, and other ferrous detectors of this type remove all metal items from the waist down. A false or inaccurate signal will be given by the detector if metal is worn.

3.4 Do not operate detector within five feet of another detector. A false or inaccurate signal may be given if detector signals overlap.

3.5 Two targets in close proximity will cause detector to give a false location. Always verify target location by re–sweeping from a different direction.

3.6 Whenever possible clear surface of UXO prior to the sub–surface clearance.

3.7 Do not submerge detector electronic package unless specifically designed for underwater or submerged use.

3.8 When recharging batteries follow the procedures in the operators manual. Do not leave battery charging longer than required. Always use the charger designed for the battery.

4.0 DETECTOR OPERATIONS

4.1 All Detectors:

4.1.1 Perform a pre–operation system and battery check in accordance with operators manual before using detector.

4.1.2 Select the program or setting required for the type of operation to be conducted.

4.1.3 Ground balance the detector in accordance with the operators manual.

4.1.4 Adjust the signal tone to a comfortable level.

4.1.5 Perform a system and battery check every two hours in accordance with the operators manual.

4.1.6 Replace batteries every four hours to ensure maximum detector performance.

4.2 Ground Loop Detector Use:

4.2.1 Keep loop parallel and as close to the ground surface as possible.

4.2.2 Sweep loop side to side to form an overlapping pattern covering the width of the search lane. Each pass of the loop should take approximately 1.5 seconds in each direction.

4.2.3 Walk forward slowly. Make sure each sweep of the loop overlaps the last. Do not lift the loop at the end of the sweep; keep it parallel to the ground.

4.2.4 When the loop passes over a metal target, a tone or change in tone will be given by the detector. To pinpoint the location of the target, move the loop over the target area in a "cross" or "X" pattern. Depending on the detector program, the point where the signal is loudest or when a null tone is achieved will be the center of the target. Refer to the operator manual for the detector for the type of response.

4.2.5 By moving the detector away from the target center and then moving the loop slowly towards the target from various directions and noting where the signal starts to change, the approximate size of the target may be estimated.

4.3 Surveyor or Bar Type Detector Use:

4.3.1 Remove all metal items from the waist down to ensure proper target identification and eliminate false signals.

4.3.2 Hold detector in front of body with lower end approximately two feet away from body and pointed towards the ground surface.

4.3.3 Sweep the bar in a side to side motion to form an overlapping pattern covering the width of the search lane. Each pass should take approximately 1.5 seconds in each direction. Rotate body side to side as needed to complete sweep.

4.3.4 Walk forward slowly. Make sure each sweep of the bar overlaps the last. Do not lift the bar at the end of the sweep; keep it angled away from your body and pointed to the ground.

4.3.5 When the bar passes over a metal target, a tone or change in tone will be given by the detector. To pinpoint the location of the target, hold the detector vertically over the target area and move in a "cross" or "X" pattern. Depending on the detector program, the point where the signal is loudest or when a null tone is achieved will be the center of the target. Refer to the operator manual for the detector for the type of response.

4.3.6 By moving detector away from the target center and then moving the tip of the bar slowly towards the target from various directions and noting where the signal starts to change, the approximate size of the target may be estimated.

4.4 Box of Split Box Detector (Pipe and Cable)

4.4.1 Remove all metal items from the waist down to ensure proper target identification and eliminate false signals.

4.4.2 Hold detector to side of body and parallel to the ground surface.

4.4.3 Walk down the center of the sweep lane at a normal pace.

4.4.4 When the detector passes over a metal target, a tone or change in tone will be given by the detector. To pinpoint the location of the target, hold the detector vertically over the target area and move in a "cross" or "X" pattern. Depending on the detector program, the point where the signal is loudest or when a null tone is achieved will be the center of the target.

4.4.5 By moving the detector away from the target center and then moving slowly towards the target from various directions and noting where the signal starts to change, the approximate size of the target may be estimated.

4.4.6 Walk slowly away from the transmitter box and trace the signal. If the signal strength starts to drop off quickly, move the detector side to side until peak signal is obtained.

4.4.7 The location of the pipe or cable will be recorded in the log, and marked on the site map. Engineer tape will be used to mark the position of the pipe or cable from where it enters the work site to where it exits the work site.

5.0 MAINTENANCE

5.1 Detector Maintenance

5.1.1 Clean exterior of detector using a cloth, an non–abrasive cleansing agent, and a bristle brush. Rinse with a clean cloth and plain water. Keep water and cleansing agents out of electronic packages. Wipe battery compartment with dry cloth if needed.

5.1.2 Inspect detector for loose or missing screws, nuts or fasteners and replace as needed.

5.1.3 Inspect battery for proper installation.

5.1.4 Inspect detector and turn in for repair if any of the following are found:

a. Broken or frayed wires.
b. Damaged connectors.
c. Dents, cuts, or excessive wear of loop detector head.
d. Bends, or breaks in tubing of box and bar type detectors.
e. Corroded or damaged battery compartment and connectors.
f. Detector fails to operate properly after performing a systems check as outlined in the operators manual.
g. Remove batteries after use and prior to storage of detector.

5.2 Battery Maintenance

5.2.1 Store batteries in a cool dry environment.

5.2.2 Replace any battery that has dents, cuts, or breaks in or swelling of the battery case.

5.2.3 Replace any battery showing leakage or seepage from the battery case.

5.2.4 Recharge batteries in accordance with operators manual. Do not short out or overcharge batteries, fire or detonation of battery may result. Do not attempt to recharge non-rechargeable batteries, detonation of battery may result.

5.2.5 Defective or unserviceable batteries will be packaged and shipped to the Wyle Norco Facility for proper disposition.

5.3 Charger Maintenance

5.3.1 Clean charger while unplugged with a damp cloth. Allow to dry completely before plugging charger into power.

5.3.2 Inspect charger and turn in for repair if any of the following are found:

a. Broken or frayed wires.
b. Damaged connectors.
c. Corroded or damaged battery compartment and connectors.
d. Charger fails to operate properly after performing a systems check as outlined in the operators manual.

5.4 Calibration

5.4.1 All magnetometers will be calibrated, if required, in accordance with the time frames listed by the manufacturer and to the design specifications using appropriate calibration methodology.

EXPLOSIVES AND UXO TRANSPORTATION PROCEDURES

STANDING OPERATING PROCEDURE	S.O.P. No. 518-200-024E
WYLE LABORATORIES	Page 1 of 4
SUBJECT: Explosives and UXO Transportation Procedures	Effective Date 13 July 1994
ISSUED BY: Explosive Ordnance Disposal (EOD)	Deletes 518-200-024D
APPROVED BY:	Dated 18 April 1994

1.0 PURPOSE

1.1 To establish procedures for the safe transportation of explosives and UXO items.

2.0 REFERENCES

2.1 DE 92-002720, DOE Explosives Safety Manual
2.2 DOD 4145-26M, Contractors' Safety manual for Ammunition and Explosives
2.3 TM 9-1300-206, Ammunition and Explosives
2.4 TM 60A-1-1-22, General EOD Safety Precautions
2.5 49CFR, Parts 172-199, Transportation
2.6 40CFR, Parts 383-393
2.7 DOE-ID Order 5480.3, Hazardous Materials Packaging and Transport Safety Requirements
2.8 DOE Hoisting and Rigging Manual
2.9 TM 60 Series
2.10 ID Appendix 0550 Standard Operational Safety Requirements

3.0 APPLICABILITY

3.1 All Wyle employees involved in the transport of explosives or UXO will read and be familiar with this SOP and the applicable references. All vehicle operations involving the transport of explosives or UXO will be in compliance with this SOP and the applicable references.

4.0 VEHICLES

4.1 Only vehicles in sound mechanical working order will be used to transport explosives and UXO. Only vehicles having a separate cargo space, i.e., pickup truck, stakebed truck, etc., will be used for the transport of explosives and UXO. The vehicle will be fully operational,

meet the requirement of applicable references, and have all required safety equipment including an emergency four-way flasher, a second 10BC fire extinguisher, placards, DD Form 626, and DD Form 836. Vehicles will have the appropriate placard clearly displayed at the front, rear, and side of the vehicle. Radios for communication with the office will be carried in the vehicle. Only designated vehicles will be used to transport explosives.

5.0 DRIVERS

5.1 Commercial drivers and operators of vehicles transporting explosives and UXO on the INEL will meet the requirements of Reference 8 and will have in their possession a current state commercial driver's license, and a qualifying medical examiner's certificate in accordance with 49CFR.

5.2 Drivers will be instructed in the proper use of the fire extinguishers, explosive routes, emergency procedures and telephone numbers, and all state and local regulations pertaining to the transportation of hazardous materials.

5.3 Drivers will not be allowed to operate vehicles under the influence of alcohol, drugs or medication which would inhibit the safe operation of the vehicles.

5.4 Smoking is not allowed when in a vehicle containing explosive or UXO.

6.0 TRANSPORT PROCEDURES

6.1 Explosives will be drawn in accordance with TM 9-1300-206, DOD 4145.26M, and all other applicable references.

6.2 Transportation of UXO and OEW will be in accordance with the referenced documents and applicable 60 series EOD publications. All transportation of demolition explosive, UXO, and OEW will be escorted by PTI security. Escort vehicles shall be separated from the transport vehicle by a minimum of four car lengths.

6.3 Requirements of Reference 2.5 will be complied with when transporting explosives on a public highway.

6.4 UXO and explosives will not be transported together.

6.4 Ordnance and explosives will be handled in a safe manner. They will not be thrown, dropped, or handled in a rough manner.

6.5 Loads will be secured to prevent movement or shifting while in transit. DOE Hoisting and Rigging Manual will be used where applicable.

6.6 Blasting caps, primers, detonators, and fuzes will not be transported with any other explosives. Primer cord and time fuze in the original or approved packing material may be transported together. Portable magazines will be separated and secured as far as possible from the other explosive items loaded on the vehicle.

6.7 When parking a vehicle carrying explosives or UXO, the wheels will be chocked in addition to setting the parking brake.

6.8 Any container used to transport UXO will be marked with the type of munition, fuze, fuze condition, and location of fuze in relation to the container. If the size of the UXO prevents transport by this method it will be loaded in the bed of the vehicle in a neutral position and sandbagged (and secured with cargo ratchet straps) in position to prevent movement during transport. All equipment or containers that contact UXO and OEW shall be made of nonsparking material.

6.9 Sandbags will be positioned on each side of the UXO for added stability.

6.10 UXOs with a fuze that may be armed will be packed in a container with cushioning material and oriented on the vehicle in a neutral position, e.g., point detonating fuze placed with base end of container against side wall of truck bed.

6.11 UXOs with a possible filler of WP or PWP will be packed in a container filled with wet sand, mud, or water. Additional water and sand will be carried on the vehicle. Incendiary munitions will be transported in a container filled with sand.

6.12 Loose explosive material, spotting charges, and exposed explosives will be packed with cushioning material.

6.13 Loose pyrotechnic and flare mixtures will be transported in a container filled with #10 mineral oil, light weight motor oil, or equivalent.

6.14 Vehicles transporting explosives or UXO will come to a full stop at approaches to railroad crossings (except when marked "EXEMPT") and main highways.

6.15 Explosives and UXO will not be transported during the hours of darkness.

6.16 Flame producing devices will not be carried on any person or in any vehicle carrying explosives or UXO.

6.17 Safe speed limits will be maintained. However, vehicles carrying explosives or UXO will not exceed 35 miles per hour.

7.0 VEHICLE EMERGENCIES

7.1 In case of an accident all explosive material will be removed from the vehicle and taken at least 300 feet from the vehicle. No attempt will be made to move the vehicle until it is unloaded. Notification of MK-FIC/DOE-ID security, local law enforcement, security and emergency response personnel will be accomplished as soon as possible.

7.2 In the event of a vehicle fire, the driver and assistant will attempt to put out the fire with the vehicle fire extinguishers. If the fire cannot be extinguished or if the explosives are burning all personnel will evacuate the hazard area and prevent others from entering the danger area. No attempt will be made to extinguish burning explosives or UXO. Notification of local law enforcement, security and emergency response personnel will be accomplished as soon as possible. Fire fighting personnel will be provided the type, amount and type of hazard being transported.

STORAGE OF EXPLOSIVES

STANDING OPERATING PROCEDURE	S.O.P. No. 518-200-028A
WYLE LABORATORIES SCIENTIFIC SERVICES & SYSTEMS GROUP	Page 1 of 5
SUBJECT: Storage of Explosives at the INEL	Effective Date
ISSUED BY: Explosive Ordnance Disposal (EOD)	Deletes 518-200-028
APPROVED BY:	Dated 19 Feb 1993

1.0 PURPOSE

1.1 To establish procedures for the safe storage of explosives at the Idaho National Engineering Laboratory (INEL).

2.0 REFERENCES

2.1
1. DOD 6055.9 STD Ammunition and Explosives Safety Standard
2. DOD 4145-26M, Contractors' Safety manual for Ammunition and Explosives
3. NAVSEA OP5 VOL 1, Amunition and Explosives Ashore Safety Regulations For Storing, Production, Renovation and Shipping
4. ID Appendix 0550 Standard Operational Safety Requirements
5. DOE Explosives Safety Manual

3.0 APPLICABILITY

3.1 All Wyle employees involved in the receipt, issue and storage of explosives will read and be familiar with this SOP and the references. All operations involving storage of explosives at the INEL will be in compliance with this SOP and applicable sections of the references.

4.0 RECEIPT OF EXPLOSIVES

4.1 Once received, explosives will be inspected as soon as possible.

4.2 Each item will be examined for damage or defect. If descrepancies are found the Project Superintendent and the Project Safety Officer will be notified immediately.

4.3 All transactions involving explosives will be accomplished by two individuals.

4.4 Explosives will be handled carefully.

4.5 Do not drop, throw, or otherwise mishandle explosives or containers containing explosives.

5.0 STORAGE PRINCIPLES

The following principles shall be observed in storing explosives.

5.1 Explosives may not be stored together with dissimilar materials or items which present positive hazards to the explosives, e.g., explosives with flamables or acids.

5.2 Different types of explosives may be stored together provided they are compatable. Only compatable explosives will be stored together.

5.3 Any explosive with uknown stability shall not be stored with any other explosives or demolition material.

5.4 References will be thoroughly researched for permissible storage compatabilities.

5.5 Explosives in substandard or damaged packaging or a suspect condition are not compatable with other explosives.

5.6 The amount of explosives permitted in any location is limited by the quantity distance criteria or the magazine capacity.

5.7 Quality distance criteria will be enforced.

6.0 MAGAZINES

Special permission will be requested from DOE and PTI for storage of explosives and for magazine siting.

6.1 The doors of all magazines containing explosives shall be kept closed and locked, except for authorized work and operations.

6.2 Doors and locks shall be kept in good working order.

6.3 Magazines shall be kept free of all extraneous material and equipment. Good housekeeping practices will prevail.

6.4 No smoking or flame or spark producing device is allowed within 50 feet or the magazine.

6.5 Only explosion proof artificial light will be used in the magazine.

6.6 Magazines will be completely emptied prior to conducting any magazine repairs.

6.7 A 50-foot wide area around the magazine shall be kept free of all combustible material.

6.8 Only authorized personnel will be allowed in the magazine area (within 50 feet).

6.9 Magazine safety regulation placards will be posted on or near each magazine door.

6.10 No painting or stenciling is allowed in the magazine.

6.11 At least two fire extinguishers of 2A:10BC will be available

6.12 Empty containers, tools, or equipment will not be stored in magazines containing explosives.

7.0 STORAGE OPERATIONS

7.1 Explosives shall be stored in stacks insofar as possible, and segregated by type and lot number.

7.2 Stacks will be arranged so that containers are accessable for use and offer an unobstructed circulation of air. Air space of six inches should be maintained between stacks and magazine walls.

7.3 The bottom layer shall be raised off the floor to provide a ventilating space and to protect the materials from water and dampness.

7.4 Partly filled boxes shall be marked to indicate this condition and placed on the top of the proper stack.

7.5 Only compatible items will be stored in the same magazine.

7.6 Use oldest stocks first.

7.7 Non-sparking tools wil be used to open containers.

7.8 Explosives will be stored in secured containers. Containers that have been opened shall be closed and securely fastened while in storage.

7.9 Damaged containers may be stored providing no hazard exists.

7.10 Containers shall not be repaired, opened or closed in magazines.

7.11 No operations will be allowed during electrical or sand storms.

8.0 ACCOUNTABILITY

8.1 All transactions involving explosives will be accomplished with two individuals.

8.2 All explosives will be accounted for using magazine log sheet (Wyle Form 959-B) and a magazine card (stack card). These forms will be completed prior to any item being placed in storage. All transactions of explosives will be recorded on these forms.

8.3 All transactions will be entered on the magazine log and stack card.

8.4 A separate log sheet and stack card are required for each lot number even if the items are identical.

8.5 The magazine log will be located at the field office. Stack cards will be placed on top of the appropriate container or stack.

8.6 Magazine keys will be kept in a secure key box located in the field office.

8.7 Inventory accountability is mandatory. Any unaccountable shortage will be reported to the Project Superintendent who will conduct an investigation with the Safety Representative. Unresolved incidents will be reported to ID-OSD, Federal, State, and local law enforcement agencies.

8.8 A monthly inventory will be conducted by the Lead EOD Technician.

HEAVY EQUIPMENT OPERATION

STANDING OPERATING PROCEDURE	S.O.P. No. 518-200-200
WYLE LABORATORIES SCIENTIFIC SERVICES & SYSTEMS GROUP	Page 1 of 3
SUBJECT: Heavy Equipment Operation	Effective Date 22 Jan 1993
ISSUED BY: Explosive Ordnance Disposal (EOD)	Deletes
APPROVED BY: J. P. Dreyer	Dated

1.0 PURPOSE

The purpose of this procedure is to establish a safe working environment for all employees working on or around heavy equipment regardless of whom the equipment may belong to (Wyle or a subcontractor). This procedure governs the use of on-site heavy equipment (i.e. forklifts, backhoes, Bobcat loaders, etc.). This procedure is not intended for commercial vehicles where the use of CDL are required.

2.0 SCOPE

This procedure applies to all Wyle employees and subcontractors, and anyone working on Wyle contracts.

3.0 REFERENCES

OSHA Standards 1926.600, 1926.601, 1926.602, 1926.1000, 1926.1001, 1926.1002.
99 CFR 383-393.

4.0 PREREQUISITES

4.1 Operators must be qualified to operate the type of equipment being utilized.

4.2 Operators in training must be under the direct supervision of an experienced operator.

5.0 EQUIPMENT AND SUPPLIES

The standard safety equipment (safety glasses, hard-hats, and steel-toed boots or shoes) must be worn, as required.

6.0 PRECAUTIONS

6.1 Operators must be notified of any underground hazards that may exist, such as electrical lines, phone lines, or gas lines or tanks.

6.2 All equipment must be equipped with back-up alarms, seat belts and rollover protective structures (ROPS) as required by OSHA

6.3 The operator shall be aware of slope stability where applicable.

6.4 Slow, deliberate operation of equipment until the operator gets "the feel" for the particular machine is required.

7.0 PROCEDURES

7.1 A pre-operation inspection must be performed by the operator. Fluid levels, fluid leaks, tire condition, cab glass, lights, back-up alarms, and other systems on the equipment must be checked prior to operation. Defects must be reported to the project field leader. Repairs will be made immediately when machine performance or safety is affected.

7.2 No guard or safety appliance or device shall be removed or made ineffective unless immediate repairs or adjustments are required, and then only after the power has been shut off. Guards and devices shall be replaced as soon as repairs and adjustments have been completed.

7.3 Seat belts must be provided and work at all times with the following exceptions:

(1) seat belts are not required in equipment designed for stand-up operation only

(2) equipment not required to have a rollover protection structure (ROPS) do not need seat belts.

7.4 Platforms, footwalks, steps, and ladders must be used for access to equipment. Always have three points of contact when climbing on equipment.

7.5 Eye contact must be made with the operator before approaching moving machinery or equipment. The operator must then stop the equipment and remove his/her hands from controls to reduce the potential hazard to ground personnel.

7.6 When performing maintenance on equipment such as greasing, fluid checks and welding, equipment shall be set and locked so that it cannot be released, dropped, or activated in any way. Frontend loader buckets shall be lowered to the ground, as well as bulldozer blades; scraper bowls shall be dropped; and crane booms shall be secured against movement.

7.7 When refueling equipment, motors must be shut off, no smoking shall be allowed, and proper dispensing equipment must be used.

7.8 Equipment suspended in slings or supported by hoists or jacks for repairs must be blocked or cribbed before workers are permitted to work underneath it.

7.9 Before mobile equipment is moved, a survey of the area in which it is located must be made to check for overhead wires, pipelines, excavations, and similar hazards, as well as ground personnel.

7.10 When leaving a truck unattended the parking brake must be set, the wheels should be chocked or turned into the bank, or both. The blade or bucket of the equipment shall be lowered to the ground to prevent movement.

EQUIPMENT AND PERSONNEL DECONTAMINATION PROCEDURES

WYLE LABORATORIES	STANDING OPERATING PROCEDURE	S.O.P. No. 518-200-201A
		Page 1 of 3
SUBJECT:	Equipment and Personnel Decontamination Procedure	Effective Date 18 April 1994
ISSUED BY:	Explosive Ordnance Disposal (EOD)	Deletes 518–200–201
APPROVED BY:		Dated 22 Jan 1993

1.0 PURPOSE

This procedure specifies requirements for providing labor, materials, and construction equipment to decontaminate construction equipment and personnel when leaving the Remedial Action Area (RAA). Decon areas will be positioned between the RAA and the support zone. All decontamination activities shall be conducted in compliance with the Health and Safety Plan

2.0 REFERENCES

2.1 Wyle Safety Policy
2.2 Site Health and Safety Plan
2.3 Site Quality Assurance Project Plan
2.4 DOE Order ID 5480.3
2.5 29 CFR Parts 172 and 173
2.6 Other applicable Wyle Standard Operating Procedures for reference purposes include:

Waste Containerization
Waste Characterization and Profile
Site Operations

3.0 SCOPE

All equipment and personnel who enter the Remedial Action Area will be subject to decontamination as specified in this document. Water will be supplied by water truck from local fire hydrants. This procedure applies to Wyle subcontractors involved in equipment and personnel decontamination activities.

4.0 EQUIPMENT

All equipment such as hand tools and other hand carried items which have been in contact with contaminated soil shall be washed at the decon station prior to leaving the RAA. Heavy equipment will be pressure washed or steam cleaned as necessary. Cab areas of equipment will be pressure washed in the same capacity when deemed necessary by the Site Health and Safety Officer. Brushed, brooms, and scrapers will be available at the work unit for equipment decontamination purposes, if required. Equipment will be washed until all loose visible dust and dirt is removed. All decon personnel will be trained in the proper use of the equipment and the criteria for the release of the items being decontaminated.

5.0 PERSONNEL

When directed by the Site Health and Safety Officer personnel shall pass through a wash/ rinse for personnel decon purposes when exiting the exclusion area. Then, in the event personnel protective clothing is worn, disposable clothing will be removed and placed into a drum provided and labeled for contaminated clothing. Protective clothing will be worn in accordance with the direction of the Health and Safety Officer.

In the case of an emergency, the decontamination procedures will be implemented as rapidly as possible. If a life-threatening injury occurs and the injured person cannot undergo decontamination procedures without incurring additional injuries or risk, he/she will be transported wrapped in plastic sheeting. The medical facility will be informed that the person has not been decontaminated and given information regarding the most probable contaminates.

6.0 MAINTENANCE

The decon area shall be kept clear of large accumulations of contamination. Decon water will be changed out on a daily basis (every two weeks estimated). The water will be changed out more frequently depending upon the actual use and at the direction of the Site Health and Safety Officer.

If used, discarded disposable clothing, respirator cartridges and gloves will be stored on–site in drums for off-site disposal. Ordinary uncontaminated refuse will be placed in suitable rubbish bins or trash containers at the site. The subcontractor will complete a waste generator form for the INEL landfill. The form will be reviewed by the contractor and will comply with the INEL Landfill Operations Waste Acceptance Criteria. Uncontaminated refuse will be disposed at the INEL landfill by the subcontractor after the contractor's approval of said waste generator form.

7.0 EXCESS DECONTAMINATION WATER

7.1 In the event water is left over after the job, it will be tested for RCRA constituents. If the water proves to be a RCRA waste it will be treated as a separate waste profile and disposed of properly. The drums would be properly marked and labeled prior to shipment.

7.2 If the water proves to be a non-hazardous waste, the water will be disposed of in one of the following methods:

- The water can be left to evaporate in a large tank
- Request an area on the site where the water may be discarded
- Transport the water to a waste water treatment plant for final treatment and disposal
- Pour water onto the ground

8.0 VISITORS

Visitors will not be allowed in the RA areas unless briefed by the Health and Safety Officer on the decontamination procedures. All visitors will be escorted while on–site and through the decon procedures in preparation to leave the site.

DUST AND EMISSIONS CONTROL

STANDING OPERATING PROCEDURE	S.O.P. No. 518-200-206A
WYLE LABORATORIES	Page 1 of 3
SUBJECT: Dust and Emissions Controls	Effective Date 14 April 1994
ISSUED BY: Explosive Ordnance Disposal (EOD)	Deletes 518–200–206
APPROVED BY:	Dated 22 Jan 1993

1.0 PURPOSE

This procedure specifies dust and emission control. Dust and emissions control practices shall be an integral part of remediation activities. Potential sources of air emissions include but are not limited to:

1. Vehicle traffic on roadways in contaminated areas
2. Movement of scrap and contaminated soil
3. Controlled detonation of ordnance or residuals
4. Material handling and transfer operations
5. Decontamination activities

2.0 SCOPE

This procedure applies to Wyle and all Wyle subcontractors for this activity. Potential contaminates in the dust may include:

1. 2,4- and 2,6-dinitrotoluene (DNT)
2. Hexahydro 1,3,5-trinitro-1,3,5-triazine (RDX)
3. 2,4,6-Trinitrotoluene (TNT)
4. Metals
5. White Phosphorus
6. Other military explosives

3.0 RELATED WORK

The following references should be consulted:
Quality Assurance Project Plan
Environmental, Safety, and Health Plan
Operation and Maintenance Plan
ARARs

4.0 PREREQUISITES

All personnel working at the INEL facility who handle and work directly within the remedial action area must be familiar with the requirements of this plan. All personnel shall have as a minimum 40 hours of hazardous waste management training in compliance with 29 CFR 1910.120, and must have had at least eight hours of refresher training within the previous 12 months. Personnel working at the INEL facility shall receive four hours of annual training from INEL security personnel.

5.0 QUALITY CONTROL

The air quality standard to be used to monitor the effectiveness of dust and emissions controls is:

1. On-site observations for fugitive dust emissions while the work is in progress by the Wyle team and/or Morrison Knudsen Company (MK) oversight personnel. Visible dust shall be kept to a minimum by the application of clean water to roadways and if needed to the work areas.

6.0 EXECUTION

6.1 EQUIPMENT

Supply labor, materials, and equipment for transporting clean water to the site and applying it to the site using spreader bars, sprays, and other controlled methods. Water will be applied manually and frequently as needed using methods demonstrated to be most effective. Clean water will be obtained from INEL fire hydrants.

6.2 VEHICLE TRAFFIC

A. Limit vehicle traffic as much as possible to designated roads in the uncontaminated areas.

B. Limit traffic in the remedial action area to designated traffic lanes.

C. Control vehicle speeds in all traffic areas.

6.3 MATERIAL MOVEMENT

A. Lift heights shall be restricted to the minimum required for free transport.

B. Free fall of materials shall be prevented to the extent possible.

C. Double handling of materials shall be limited to the extent possible.

D. Water shall be applied during the movement of contaminated scrap debris and soil on an as needed basis.

THERMITE BURN OUT OF ORDNANCE

STANDING OPERATING PROCEDURE	S.O.P. No. 518-200-209
WYLE LABORATORIES SCIENTIFIC SERVICES & SYSTEMS GROUP	Page 1 of 3
SUBJECT: Thermite Burn Out of Ordnance	Effective Date 19 April 1993
ISSUED BY: Explosive Ordnance Disposal (EOD)	Deletes
APPROVED BY:	Dated

1.0 PURPOSE

1.1 To establish general guidelines for conducting thermite burn out procedures on UXO.

1.2 This SOP is intended to be used as a general guideline for school–trained Explosive Ordnance Disposal personnel. Formal EOD training includes alternate procedures for disposal of UXO; one of the alternate procedures is thermite burn out.

1.3 The guidelines provided in this procedure are generic in nature and are not intended to address a specific UXO item.

2.0 REFERENCES

2.1 DOD 6055.9 STD, Ammunition and Explosives Safety Standard
2.2 FM 5–25, Explosives and Demolitions
2.3 NAVSEA 3565, Explosives of Electromagnetic Radiation to Ordnance
2.4 TM9 1375–213–12, Demolition Materials
2.5 ID Appendix 500 Subpart 111, Explosives Standard Operational Safety Requirements
2.6 DOE Explosive Safety Manual
2.7 EOD 60 Series Manuals
2.8 SOP 518–200–011D, Demolition Procedures (Electric Firing Systems)
2.9 SOP 518–200–012C, Demolition Procedures (Non–Electric Systems)

3.0 SAFETY

3.1 Safety is always of paramount importance, therefore, EOD personnel conducting thermite burn out disposal procedures will become familiar with and observe all general and applicable safety regulations and requirements contained in the references.

3.2 Always observe a 30–minute wait prior to returning to disposal site following all signs of burn or detonation.

> **WARNING**
>
> Prepare for a possible high order detonation during any burn out procedure. Take appropriate precautions for the protection of personnel and property.

4.0 OPERATIONAL PROCEDURES

This procedure is designed for burn out disposal of explosive filler material on thin cased UXO and that UXO which has been breached.

4.1 Remove thermite grenade fuze from grenade body. Save fuze for later destruction.

4.2 Cut and prepare a suitable length of time safety fuze, as directed in the reference.

4.3 Using a knife fishtail one end of the safety time fuze.

4.4 Pour 1/2 ounce of smokeless power into the thermite grenade fuze well.

4.5 Insert the fishtailed end of the safety fuze into the fuze well of the thermite grenade. Tape into position.

4.6 Connect the fuze lighter to the free end of the time safety fuze.

> **CAUTION**
>
> Do not move UXO when positioning thermite grenade.

4.7 Position thermite grenade on exposed explosive filler material or on the thinnest part of the UXO skin.

> **NOTE**
>
> Certain UXO items may require the use of more than one thermite grenade for burn out disposal. In such cases thermite grenades will be taped together.

4.8 Evacuate all non–essential personnel.

4.9 Initiate time safety fuze and retreat to the designated safe area.

4.10 Inspect the site after the mandatory 30–minute wait.

4.11 Dispose of remains as required.

5.0 MISFIRE PROCEDURES

5.1 If thermite grenade fails to function WAIT ONE HOUR from time of expected initiation before investigating.

> **WARNING**
>
> Working on or near a misfire is extremely hazardous. Do not handle suspected misfire until after the required waiting period has elapsed.

5.2 Remove thermite grenade from UXO.

5.3 Remove safety time fuze from the thermite grenade.

5.4 Prepare new fuze as per Section 4.

5.5 Proceed as per Section 4.

EMERGENCY SPILL RESPONSE

WYLE LABORATORIES	STANDING OPERATING PROCEDURE	S.O.P. No. 518-7-97B
		Page 1 of 3
SUBJECT:	Emergency Spill Response	Effective Date 13 July 1994
ISSUED BY:	Explosive Ordnance Disposal (EOD)	Deletes 518–7–97 A
APPROVED BY:		Dated 18 Apr 1994

1.0 PURPOSE

The purpose of this Emergency Spill Response Procedure is to define the actions to be taken by Wyle personnel and subcontractors in the event of a spill of hazardous material.

2.0 REFERENCES

2.1 DOE/ID 5000.3B, Occurrence Reporting and Processing of Operations Information

2.2 DOE/ID 5484.1B, Environmental Protection, Safety and Health Protection Information Reporting Requirements

2.3 DOE 5500.1B, Emergency Management System

3.0 SCOPE

This procedure applies to the spill of any hazardous material identified at the Idaho National Engineering Laboratory. Hazardous materials routinely stored, handled, and transported during remediation are oils, gasoline and diesel fuels.

4.0 PROCEDURE

The directions in this subsection are to be followed in the event of any identified spill or leak of hazardous materials. It is imperative that timely action be taken to preserve environmental integrity and ensure health and safety.

4.1 The following actions shall be taken immediately upon identifying a spill or leak:

(a) Take any remedial action for containment and cleanup (e.g., shutting off valves) that can be safely performed.

(b) Notify the Wyle Project Superintendent of the spill. Provide him with information regarding the location, the material, the extent of the spill, and any injuries or damages incurred from the spill.

(c) Provide assistance to personnel known or suspected to have been exposed to a hazardous substance or chemical.

(d) Isolate the hazardous area and prohibit entry by other personnel to prevent inadvertent exposure to the spill or its by-products (e.g., vapors/gases).

(e) Unless directed otherwise by the Project Superintendent or occupied by immediate emergency actions (e.g., transporting injured personnel to medical facilities), remain available at the site to direct cognizant personnel to the spill location.

4.2 The following actions shall be taken by the Wyle Project Superintendent:

(a) Instruct the individual(s) reporting the spill as to which actions they should take.

(b) Notify the RAE of the incident and pass along the pertinent information.

(c) Notify the Wyle Project Health and Safety Officer of the spill and pass along the pertinent information.

(d) Assist the Health and Safety Officer in immediate response and supervise affected personnel.

4.3 Upon notification, the Project Health and Safety Officer shall proceed to the spill site to make an assessment and to assist the RAE.

5.0 REPORTING REQUIREMENTS

The Wyle Health and Safety Officer is responsible for the following follow-up activities:

(1) The immediate reporting of environmental incidents and releases to the MK-FIC/ RAE.

(2) The event is recorded in a logbook and that an Incident/Event Report Form is completed and transmitted, as required, to the MK-FIC/RAE.

(3) Providing any follow-up information requested by MK-FIC.

6.0 REPORTABLE QUANTITIES

The reportable quantities below are used by the MK-FIC/RAE to determine the need for additional reporting. The Health and Safety Officer will assist the MK-FIC/RAE in providing supporting information for such reports.

Material	Reportable Quantity
Gasoline	10 lbs
Ethyl Glycol	1 lb (1 pint) or (1 quart) in a 50/50 water mixture
Motor Oil	N/A
Hydraulic Oil	N/A

OPERATING GUIDELINE FOR DECONTAMINATION

WYLE LABORATORIES SCIENTIFIC SERVICES & SYSTEMS GROUP	**OPERATING GUIDELINE**	**W.O.G. No.** 200-1
		Page 1 of 6
SUBJECT: Decontamination		**Effective Date** 22 Jan 1993
ISSUED BY: Explosive Ordnance Disposal (EOD)		**Deletes**
APPROVED BY:		**Dated**

1.0 DECONTAMINATION

Contamination of the worker, equipment, vehicles, building, or environment is always a possibility. To minimize the risk to anyone, the following guidelines are established,

Personal Protective Equipment (PPE)

PPE is the last line of defense between you and hazardous materials.

- Always use the required equipment
- Check the equipment before using for cleanliness and serviceability. Do not use equipment that is dirty, contaminated or in disrepair.
- Always clean all reusable protective equipment after use. Do not store dirty equipment.
- Always dispose of dirty or damaged disposable clothing in an appropriate manner.
- Reusable equipment shall be used whenever possible from a waste minimization standpoint.
- Decontamination procedures must be tailored to the specific hazards of the site, and will vary in complexity and number of steps, depending on the level of hazard and the employee's exposure to the hazard. Decontamination methods will vary depending upon the specific substance, since one procedure or method will not work for all substances. Evaluation of decontamination methods and procedures must be performed, as necessary, to assure that employees are not exposed to hazards by re-using PPE.

2.0 CLEAN-UP AND DECONTAMINATION

Water is generally one of the best solvents and cleaning agents. Mild detergents and water will successfully decontaminate much of what we will be handling. Therefore, soap and

water will usually be the first decontamination solution used.

Follow manufacturers' instructions, when available, for the proper cleaning of personal protective equipment.

- For personal hygiene, only soap and water or solvent removers designed for human use will be used.
- Wash hands thoroughly before eating or smoking.
- Wash hands, arms and face at lunch and before changing into personal clothes. A full shower is recommended at the end of a shift.
- Employees must thoroughly shower whenever there has been significant skin contact with hazardous materials. Significant is ambiguous but includes any contact or high probability of contact with a solid, liquid, or vapor on more than the hands.
- Remember that clean-up solutions may ultimately need to be treated as hazardous waste. Make sure that you control their distribution until you know the proper and safe method of disposal.
- Whenever it is known or suspected that personnel have been contaminated with highly toxic or skin-destructive substances, a full decontamination procedure must be followed.
- A worker leaving the controlled area to pick up or drop off tools or instruments and immediately returning may not require decontamination. A worker leaving to get a new air cylinder or to change a respirator or canister, however, may require some degree of decontamination. Individuals departing the area for a break, lunch, or at the end of day, must be thoroughly decontaminated.
- Multiple rinses with clean solutions remove more contaminants than a single rinse with the same volume of solution. Continuous rinsing with large volumes will remove even more contaminants than multiple rinsings with a lesser total volume.

3.0 TESTING FOR THE EFFECTIVENESS OF DECONTAMINATION

Decontamination methods vary in their effectiveness for removing different substances. The following methods may be useful in assessing the effectiveness of decontamination.

Visual Observation

There is no reliable test to immediately determine how effective decontamination is. In some cases effectiveness can be estimated by visual observation.

1. Natural light. Discolorations, stains, corrosive effects, visible dirt, or alternations in clothing fabric may indicate that contaminants have not been removed. However, not all contaminants leave visible traces; many contaminants can permeate clothing and are not easily observed.

2. Ultraviolet light. Certain contaminants, such as polycyclic aromatic hydrocarbons, which are common in many refined oils and solvent wastes, fluoresce and can be visually detected when exposed to ultraviolet light. Ultraviolet light can be used to observe contamination of skin, clothing, and equipment; however, certain areas of the skin may fluoresce naturally, thereby introducing an uncertainty into the test. In addition, use of ultraviolet light can increase the risk of skin cancer and eye damage; therefore, a qualified health professional should assess the benefits and risks associated with ultraviolet light prior to its use.

Wipe Sampling

Wipe testing provides after-the-fact information on the effectiveness of decontamination. In this procedure, a dry or wet cloth, glass fiber filter paper, or swab is wiped over the surface of the potentially contaminated object and then analyzed in a laboratory. Both the inner and outer surfaces of protective clothing should be tested. Skin may also be tested using wipe samples.

Cleaning Solution Analysis

Another way to test the effectiveness of decontamination procedures is to analyze for contaminants left in the cleaning solutions. Elevated levels of contaminants in the final rinse solution may suggest that additional cleaning and rinsing are needed.

Testing for Permeation

Testing for the presence of permeated chemical contaminants requires that pieces of the protective garments be sent to a laboratory for analysis.

4.0 HEALTH AND SAFETY HAZARDS

While decontamination is performed to protect health and safety, it can pose hazards under certain circumstances. Decontamination methods may:

1. Be incompatible with the hazardous substances being removed (i.e., a decontamination method may react with contaminates to produce an explosion, heat, or toxic products).

2. Be incompatible with the clothing or equipment being decontaminated (e.g., some organic solvents can permeate and/or degrade protective clothing).

3. Pose a direct health hazard to workers (e.g., vapors from chemical decontamination solutions may be hazardous if inhaled, or they may be flammable).

The chemical and physical compatibility of the decontamination solutions or other decontamination materials must be determined before they are used. Any decontamination method that permeates, degrades, damages, or otherwise impairs the safe functioning of the PPE is incompatible with such PPE and should not be used. If a decontamination method does pose a direct health hazard, measures must be taken to protect both decontamination personnel and the workers being decontaminated.

5.0 DISPOSAL METHODS

All equipment used for decontamination must be decontaminated and/or disposed of properly. Buckets, brushes, clothing, tools, and other contaminated equipment should be collected, placed in containers, and labeled. Also, all spent solutions and wash water should be collected and disposed of properly. Clothing that is not completely decontaminated should be placed in plastic bags, pending further decontamination and/or disposal.

6.0 EMERGENCY DECONTAMINATION

In an emergency, the primary concern is to prevent the loss of life or severe injury to site personnel. If immediate medical treatment is required to save a life, decontamination should be delayed until the victim is stabilized. If decontamination can be performed without interfering with essential life-saving techniques or first aid, or if a worker has been contaminated with an extremely toxic or corrosive material that could cause severe injury or loss of life, decontamination must be performed immediately. If an emergency due to a heat-related illness develops, protective clothing should be removed from the victim as soon as possible to reduce the heat stress. During an emergency, provisions must also be made for protecting medical personnel and disposing of contaminated clothing and equipment.

7.0 SOME RECOMMENDED EQUIPMENT FOR DECONTAMINATION OF PERSONNEL AND PERSONAL PROTECTIVE CLOTHING AND EQUIPMENT

- Drop cloths of plastic or other suitable materials on which heavily contaminated equipment and outer protective clothing may be deposited.

  Collection containers, such as drums or suitably lined trash cans, for storing disposable clothing and heavily contaminated personal protective clothing or equipment that must be discarded.

- Lined box with absorbents for wiping or rinsing off gross contaminants and liquid contaminants.

- Large galvanized tubs, stock tanks, or children's wading pools to hold wash and rinse solutions. These should be at least large enough for a worker to place a booted foot in, and should have either no drain or a drain connected to a collection tank or appropriate treatment system.

- Wash solutions selected to remove contaminates and contaminated wash solutions.

- Long-handled, soft-bristled brushes to help wash and rinse off contaminants

- Paper or cloth towels for drying protective clothing and equipment.
- Metal or plastic cans or drums for contaminated wash and rinse solutions.
- Plastic sheeting, sealed pads with drains, or other appropriate methods for containing and collecting contaminated wash and rinse solutions spilled during decontamination.
- Shower facilities for full body wash or, at a minimum, personal wash sinks (with drains connected to a collection tank or appropriate treatment system).
- Soap or wash solution, wash cloths, and towels for personnel.
- Lockers or closets for clean clothing and personal item storage.
- PPE for personnel conducting decontamination procedures will be Level C, unless down graded by Site Safety Officer. Level C PPE will be required while deconning heavy equipment.